No. 8172-B

JVC Service Manual

COLOUR VIDEO CAMERA

MODEL GX-33E/66E

CAMERA ADAPTER

MODEL GA-23E

VICTOR COMPANY OF JAPAN, LIMITED.

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GX33E/66E

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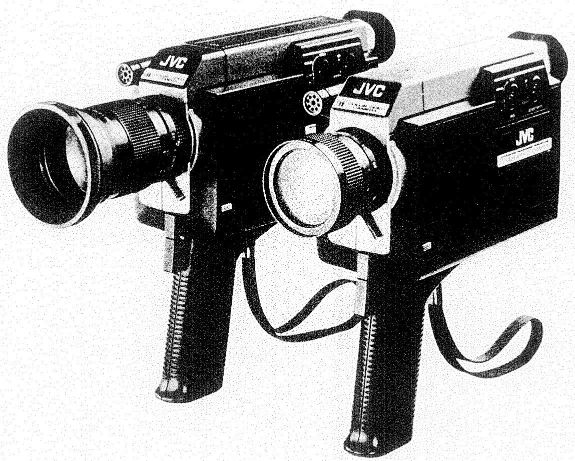


MODEL GX-33E/66E

VICTOR COMPANY OF JAPAN, LIMITED

SECTION 1
GENERAL DESCRIPTION

1.1 INTRODUCTION

This manual describes the adjustments of electrical operation of the GX-33E/GX-66E colour video camera. Service procedures given herein cover only field maintenance services. Adjustments which require high-level instrument, jigs and techniques are excluded, since they should be performed at a JVC Regional Center for factory service.
Due to design modifications, the servicing procedures and data given in this manual are subject to possible change without prior notice.

This service manual has been prepared in common for two models GX-33E and GX-66E. Both models are identical with each other, the only difference is in their lenses. The GX-33E has a 3X zoom lens and the GX-66E has a 6X zoom lens. The photographs used in explaining their common items of operation include both the GX-33E and GX-66E.

1.2 FEATURES

- Weighing in at only 1.4 kg/1.5 kg with handgrip, the handy GX-33E/GX-66E presents an 8-mm-like "camera feel", yet its picture quality is excellent enough to deliver well-defined beautiful colour pictures.
- When used in combination with a portable video cassette recorder, the GX-33E/GX-66E can be driven by the recorder's built-in battery pack; so on-the-spot out-of-doors recordings can be performed with ease.
- The built-in single-lens reflex viewfinder permits real-image focusing and zooming.
- The automatic iris control mechanism saves you inconvenience in setting the aperture according to the lighting condition; manual override is also possible.
- The colour temperature compensator switch helps adjust the colour balance accurately in a single operation.
- A sensitivity select switch is provided to facilitate recordings under low lighting conditions (as low as 100 lux).
- A lock mechanism for the recording switch offers a running-lock mode in which recording continues even when you release your finger from the switch, and a safety-lock mode which prevents this recording switch from being accidentally engaged during transportation.
- The handgrip is detachable to facilitate flexible applications.
- A high-sensitivity microphone is built in to pick up sound dimultaneously with pictures.
- A low power consumption of 7.5 watts has been achieved through a design with emphasis on energy saving.

1.3 PRECAUTIONS

- Do not aim the camera lens directly at extremely bright objects such as the sun or other strong light sources. Do not keep the lens directed at bright lights for long periods. These incorrect usages could burn the vidicon target. When the camera is not in use, be sure to cap the lens.
- Do not allow inflammables, water or metallic objects to enter the camera, as this will cause damage or malfunctioning.
- Do not subject the camera to high temperatures for long periods of time. Subjecting it to direct sunlight or placing it near a heater may cause its cabinet to become deformed or the semiconductors and mechanical parts to malfunction.
- Do not disassemble any part of the unit, as electric shocks could result.
- Be careful not to subject the camera to excessive vibrations or shocks.
- Avoid using the camera near radio or TV transmitting antennas or motors and magnets which produce strong electro-magnetic fields, as these could cause distorted pictures.
- If the camera is left unused for a long period of time, the vidicon tube deteriorates. Be sure to operate the camera with the power on for 1 – 2 hours at least once every 6 months.

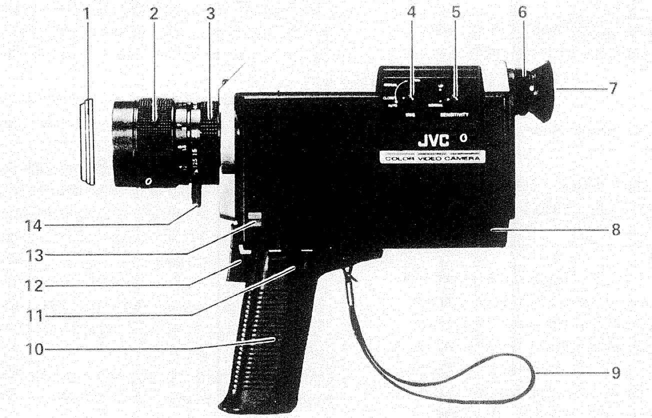
WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

This video camera should be used with 12 V DC only.

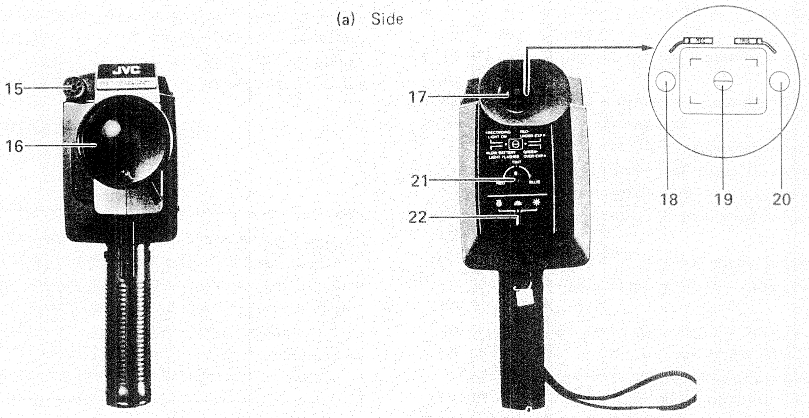
CAUTION:
To prevent electric shocks and fire hazards, do NOT use any other power source.

Note:
The rating plate is on the bottom of the unit.

1.4 CONTROLS AND CONNECTORS



(a) Side



(b) Front

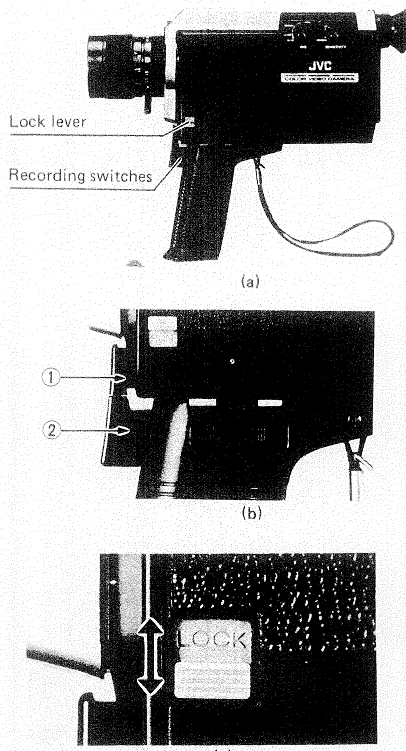
(c) Rear

Fig. 1-1

1. **Lens cap**
2. **Forcus ring**
   Rotate to focus the lens.
3. **Zoom ring**
   Rotate by the zoom lever to zoom from telephoto to wide-angle or vice versa.
4. **AUTO/MANUAL IRIS control knob**
   Set it to the AUTO position for normal shooting. Turn it in the MANUAL range to adjust the iris manually.
5. **SENSITIVITY select switch**
   Normally leave it in the NORMAL position. Set it to the UP position when sufficient illumination is not available.
6. **Diopter control ring**
   Turn it to suit the lens to your eyesight, see page 1-7.
7. **Eye cup**
8. **Camera cable connector**
   Connect the camera cable (provided) for the connection of a video recorder or a camera adapter.
9. **Wrist strap**
10. **Handgrip**
11. **Handgrip retaining screw**
12. **Recording switches**
    Two switches, one on the camera body and one on the handgrip, are interlinked for joint operation when the handgrip is attached. Press to start the tape and release for stopping the tape. See the next page for more information.
13. **Lock lever**
    To lock or unlock the recording switch. For more details, see the next page.
14. **Zoom lever**
15. **Built-in condenser microphone**
    High-sensitivity, omni-directional microphone. During outdoor shooting, attach the provided wind screen.
16. **Zoom lens**
    GX-33E: f/1.9, 3 x zoom lens
    (f = 15 – 45 mm)
    GX-66E: f/1.9, 6 x zoom lens
    (f = 12.5 – 75 mm)
17. **TTL (through-the lens) optical viewfinder.**
18. **Recording indicator/Battery warning lamp**
    Lights red during recording and flickers red when the power of the battery pack (built into the portable recorder) becomes insufficient during recording.
19. **Split-image range finder**
    For focusing, turn the focus ring until the images in the upper and lower half circles coincide with each other. For more details, see page 1-8.
20. **IRIS indicator lamp**
    Lights red for under-exposure and lights green for over-exposure. No light means that you are shooting with correct exposure.
21. **TINT control**
    Use to adjust tint. Turning clockwise increases bluish tint; conterclockwise increase reddish.
22. **Colour compensator switch**
    Adjusts colour according to the lighting conditions. For more details, see page 1-9.

Some notes on the recording switches and their lock lever

When the handgrip is attached, press recording switch ②. When the camera is mounted on a tripod with the handgrip removed, press recording switch ①.



(a)

(b)

(c)

Fig. 1-2

	Starting the tape	Stopping the tape
Normal shooting	(1) Set the lock lever to the RUN position. (2) Press the recording switch.	● Release your finger from the recording switch.
Running lock	(1) Set the lever to RUN. (2) Press the recording switch. (3) While holding the recording switch pressed, set the lever to LOCK. The recording switch will be locked in for continuous recording.	● Set the lock lever to RUN. The recording switch will pop up and recording will stop. ● If you press the recording switch in this state, recording will start once again.
Safety lock	Set the lock lever to LOCK when the recording switch is in its "out" position. The recording switch will be locked in this state and cannot be engaged. Employ this facility when you are carrying the camera to prevent the recording switch from accidentally being engaged during transportation.	

1.5 PREPARATIONS

1.5.1 Connecting the camera cable

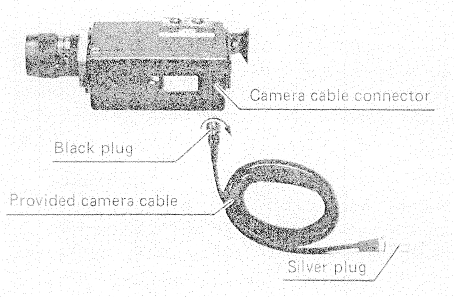

Camera cable connector
Black plug
Provided camera cable
Silver plug

Fig. 1-3

Insert the black plug of the camera cable (provided) into the camera cable connector on the bottom of the camera body and tighten the retaining ring securely in the direction of the arrow.

1.5.2 Attaching the handgrip

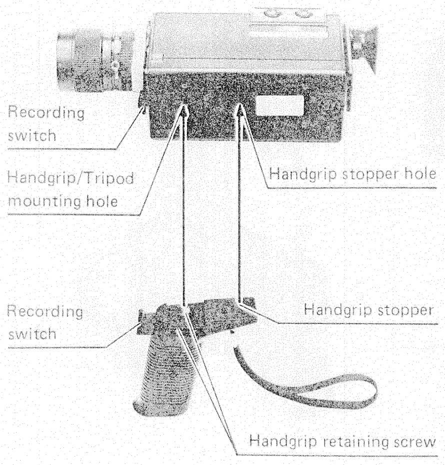

Recording switch
Handgrip/Tripod mounting hole
Handgrip stopper hole
Recording switch
Handgrip stopper
Handgrip retaining screw

Fig. 1-4

Affix the handgrip onto the bottom of the camera while inserting the retaining screw and the stopper into the corresponding holes and aligning the protruding part of the recording switch on the handgrip into the recess of the recording switch on the camera body. Then turn the knurled ring of the retaining screw in the direction of the arrow to secure the handgrip to the camera firmly.

1.5.3 Attaching the wind screen and the lens cap

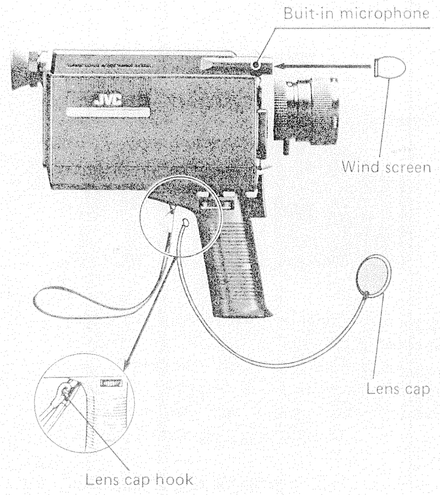

Buit-in microphone
JVC
Wind screen
Lens cap
Lens cap hook

Fig. 1-5

Fit the wind screen (provided) onto the camera microphone. Turning the wind screen will facilitate fitting.

> *Employ the wind screen when you are using the camera outdoors. Rustling noise due to wind will be reduced in recordings.*

Connect the lens cap hook to the wrist strap ring.

1.5.4 Mounting onto a tripod

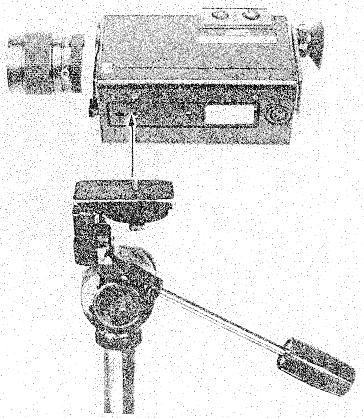


Fig. 1-6

Mount the camera on the tripod and tighten the lock screw provided on the tripod.

1.6 CONNECTIONS

1.6.1 Connecting to a JVC portable video cassette recorder

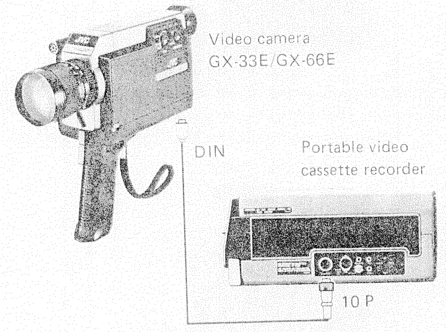

Video camera
GX-33E/GX-66E
DIN
Portable video cassette recorder
10 P

Fig. 1-7

1. Set the lock lever on the camera to the LOCK position to prevent the recording switch from becoming engaged.
   - Operate the lock lever with the recording switch in its "out" position.

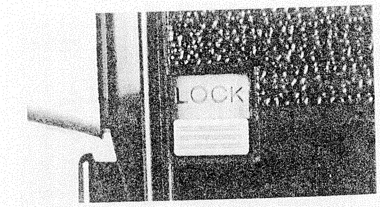


Fig. 1-8

2. Insert the black plug of the camera cable (provided) into the camera cable connector on the bottom of the camera body and tighten the retaining ring firmly by turning in the direction of the arrow.

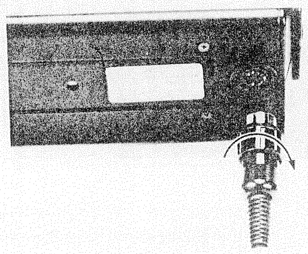


Fig. 1-9

3. Insert the silver plug of the camera cable into the camera connector on the portable recorder and tighten the retaining ring firmly by turning in the direction of the arrow.

Caution: Other brands of recorders may not be electrically compatible, even though the same type of connector is used.

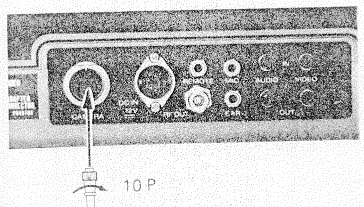

CAMERA
DC IN 12V
RF OUT
REMOTE
MIC
EAR
AUDIO
VIDEO
IN
OUT
10 P

Fig. 1-10

1.6.2 Connecting to a JVC stationary video cassette recorder

If you use this camera in combination with a video recorder other than the JVC portable video casseette recorder, an additional camera adapter is needed.

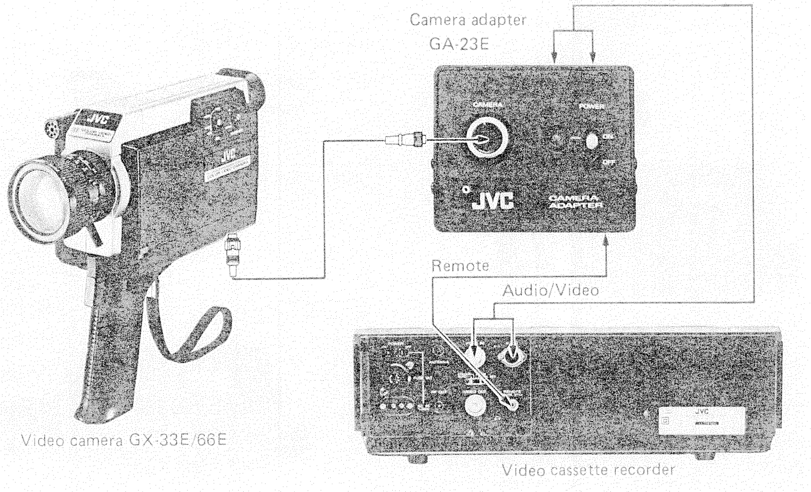


Fig. 1-11

1. Connect the camera cable to the camera connector (CAMERA) of the adapter.
2. Connect the VIDEO OUT terminal of the adapter to the video input terminal of the recorder.
3. Connect the AUDIO OUT terminal of the adapter to the audio input terminal of the recorder.
4. Connect the REMOTE connector of the adapter to the REMOTE PAUSE connector of the recorder using the remote control cable supplied with the adapter.

NOTE:
With video recorders which are not equipped with a remote pause control terminal the camera's recording switch does not function. Be sure to operate the recorder for starting and stopping the tape transport.

1.7 RECORDING OPERATION

1. Set the lock lever to the LOCK position.
   - Operate the lock lever with the recording switch in its "out" position. If the recording switch has been engaged and locked, first set the lock lever to the RUN position to release the recording switch and then set the lock lever to the LOCK position.

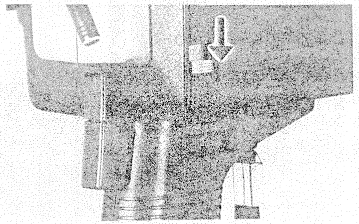


Fig. 1-12

2. Set the IRIS knob to the AUTO position.
   - For manual control, see page 1-10.

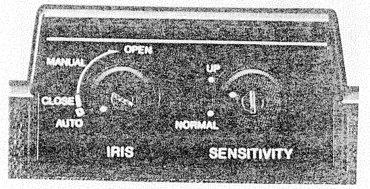


Fig. 1-13

3. Depress the REC and PLAY keys of the recorder simultaneously. Now, the Record standby mode is obtained.

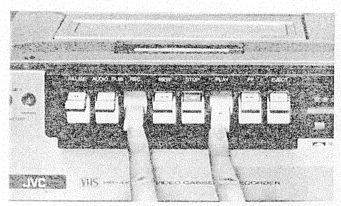


Fig. 1-14

4. Set the lock lever to the RUN position and, after confirming the focus and composition, press the recording switch.
   Recording will start and the recording indicator (left lamp in the viewfinder) will light.

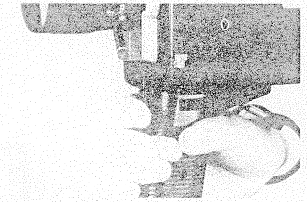


Fig. 1-15

5. Release the recording switch to stop recording.
   - If the Standby mode continues for more than 5 minutes, release the Standby mode by setting the recorder in the Stop mode.

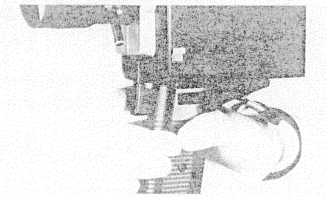
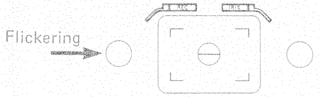


Fig. 1-16

When using recorders other than the JVC portable recorders, refer to the relevant instruction book for recording procedure.

CAUTION
- Do not continue the Standby mode for more than 5 minutes. Release the Standby mode by depressing the recorder's STOP key.
- If the the recording indicator begins to flicker, it means that the battery power is not sufficient. In such a case, stop recording and replace or recharge the battery pack in the recorder.
  If you continue to shoot with the battery warning lamp flickering, recordings of normal pictures cannot be obtained. Also, once the battery pack is fully discharged, it is unable to be recharged. It is, therefore, recommended that the battery pack be replaced as soon as the battery warning lamp should start flickering.



- After shooting, set the lock lever to the LOCK position and cap the lens.

1.8 DIPTER CONTROL

Before you use this camera or when the camera operator is changed, diopter control is required to adjust the lens to suit the operator's eyesignt, OTHERWISE SHARPLY INFOCUSED PICTURES MAY NOT BE OBTAINED.

1. Turn the zoom ring fully toward wide-angle (15 mm).
2. Set the focus ring to infinity (∞).
3. Aim at a subject that's more than 20 m from the camera so that its vertical outline appears in the split-image range finder.
4. Turn the diopter control ring until the images in the upper and lower half circles are aligned with each other.

Note:
If the available subject is not more than 20 m away due to the shooting location, adjust the focus ring to 3 m and select a suitable subject that's 3 m away from the camera.

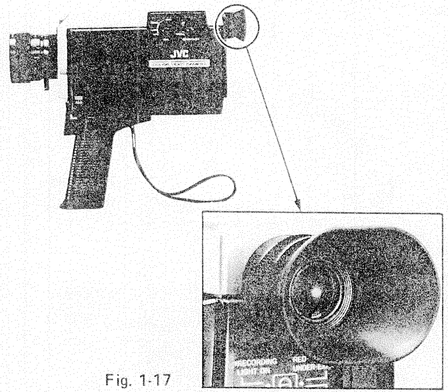
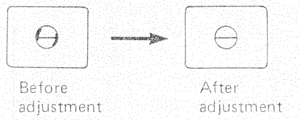


Fig. 1-17

Easy way of diopter control



- Turn the diopter control ring until the circle in the viewfinder presents a clear thin line.
- Pointing the lens at the open sky or a plain wall will facilitate this adjustment.
- There is no need to adjust the focus and zoom rings.

1.9 FOCUSING

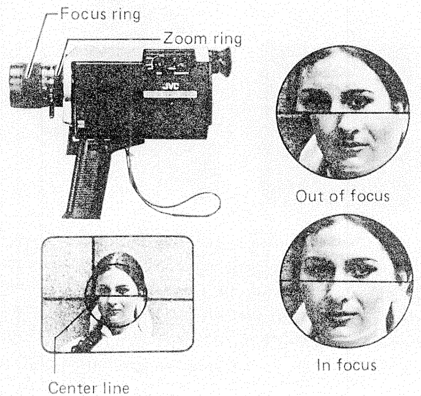


Fig. 1-18

1. Turn the zoom ring to zoom in on a subject (maximum telephoto).
2. Position the subject so that its vertical outline comes into the split-image range finder and turn the focus ring until the images in the upper and lower half circles are aligned with each other referring to the vertical line.

NOTE:
- *Be sure to focus the lens in the maximum telephoto position, otherwise sharply-focused images cannot be obtained when the subject is zoomed up during recording.*

1.10 MACRO SHOTS (GX-66E only)

Macro shots mean close-ups of small subjects taken from a very close range. Small flowers, prints, stamps, etc., can all be captured in minute detail.

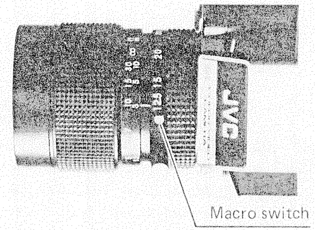


Fig. 1-19

1. While pushing in the macro switch, turn the zoom ring further in the wide-angle direction until the index line lies within the area from the macro switch to the and of the arrow mark. The macro switch is locked in after you release your finger.
2. Position the camera near the subject and slowly turn the zoom ring to focus while viewing through the viewfinder. The split-image range finder does not function in the macro area. Focus the lens so that the subject is most clearly seen through the viewfinder. The focus ring may be in any pocition.

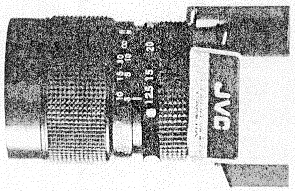


Fig. 1-20

3. To release the macro shooting mode, turn the zoom ring toward telephoto. The macro switch will be automatically released.

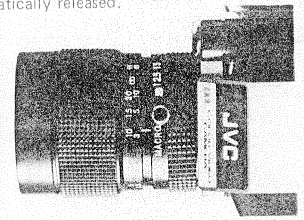


Fig. 1-21

1.11 COLOR TEMPERATURE SETTING

The human eye is adaptable to different lighting, therefore after becoming accustomed to the tinted lighting, if the subject is a bit reddish or bluish, the eye does not detect the difference. But cameras are not so adaptable, and if the light source is reddish, white things are recorded as reddish. The COLOR COMPENSATOR switch of the camera will help the camera compensate for different lighting conditions.

TINT control

The TINT control makes a more delicate color adjustment possible. Turning the TINT control clockwise increases the bluish tint while turning it counterclockwise increases reddish tint. This adjustment should be made while viewing the picture on a connected monitor. If a monitor is not available, leave the TINT control at its center click-stop position. This control functions for all three settings (💡 In-door, 🌅 Morning/Evening, ☀ Outdoor) of the color compensator switch.

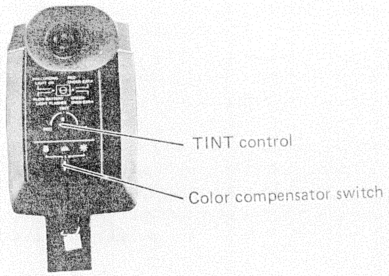
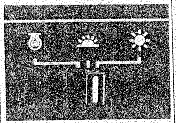
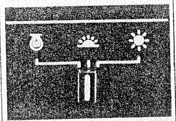
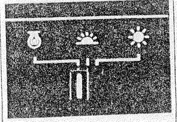


Fig. 1-22

Switch position	Lighting	Description
	Outdoors in the daytime.	Set the switch to OUTDOOR regardless of the weather when you shoot in the daytime outdoors. However, in smoggy urban or industrial areas or in the afternoon in winter, the picture becomes reddish because of reduced color temperatures. In such cases, set the switch to MORNING/EVENING. On the other hand, under a cloudy sky, in the rain or in the shade, the picture becomes bluish. In such cases, fit a color conversion filter (available on the market) onto the front of the lens.
	Outdoors in the morning or evening, or under fluorescent lighting.	The picture becomes reddish under fluorescent lighting or in the morning or evening. To compensate for this, set the switch to MORNING/EVENING. If you wish to emphasize the red or the morning light or evening glow, leave the switch set to OUTDOOR. The color temperature of fluorescent lights differs between different types. Select the switch position referring to the table on page 1-12.
	Halogen lamp or tungsten lamp.	This indoor setting will provide satisfactory results with most halogen and tungsten lighting.

1.12 IRIS CONTROL

1.12.1 Automatic iris control

This camera is provided with an automatic iris control mechanism which adjusts the lens aperture according to the amount of entering light. In most situations, the automatic iris control mode (with the IRIS knob set to AUTO) produces satisfactory results.

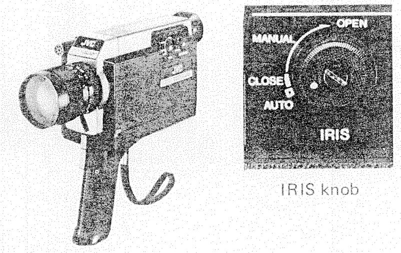


Fig. 1-23

- Align the white index mark on the knob to the AUTO position.

NOTES:
- *The IRIS indicator lamp in the viewfinder may flash from time to time even in the automatic iris control mode. This is not due to any defect of the unit.*
- *If the IRIS indicator lamp remains lit red, the amount of light is insufficient. Apply additional illumination.*
- *If the IRIS indicator lamp remains lit green, the amount of light is excessive. Use a neutral density (ND) filter. See page 1-11.*

1.12.2 Manual iris control

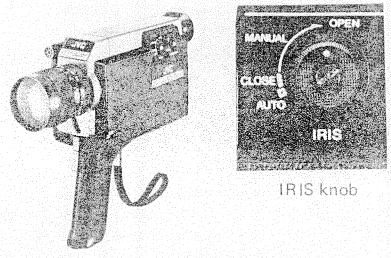
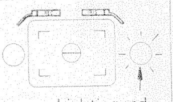
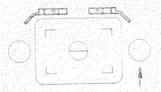
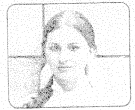
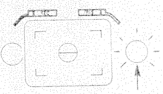
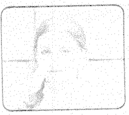


Fig. 1-24

- Turn the IRIS knob in the MANUAL range so that the IRIS indicator lamp in the viewfinder extinguishes.

NOTE:
- *If you switch the iris control mode from AUTO to MANUAL during recording, the picture becomes dark because the lens aperture is first closed and then windened as the IRIS knob is turned toward the OPEN direction. Therefore, first stop recording and then switch the iris control mode.*

	IRIS indicator lamp	Recorded picture	Adjustment	Remarks
Under-exposure			Turn the IRIS knob toward OPEN until the lamp extinguishes.	If the lamp fails to extinguish even when the knob is fully turned toward OPEN, set the SENSITIVITY switch to the UP position. If this still fails to serve the purpose, additional illumination is required. The SENSITIVITY select switch should be at NORMAL except in this case. See page 1-11.
Optimum exposure			Shoot always after confirming that the IRIS indicator lamp is not lit.	
Over-exposure			Turn the IRIS knob toward CLOSE until the lamp extinguishes.	If the lamp fails to extinguish even when the knob is fully turned toward CLOSE, the amount of light is excessive. Use a neutral density (ND) filter. See page 1-11.

1.13 MAKING GOOD COLOR PRODUCTIONS

1.13.1 SENSITIVITY select switch

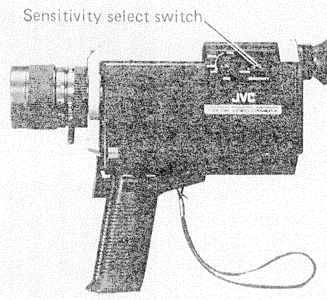


Fig. 1-25

This switch is provided to enable shooting under low-lighting conditions by raising the camera's sensitivity. When the IRIS indicator lamp continues lighting red in the AUTO mode or when it fails to extinguish in the MANUAL mode when the IRIS knob is fully turned toward OPEN, set this switch to the UP position. For situations other than those mentioned above, be sure to set the SENSITIVITY select switch to the NORMAL position.

1.13.2 Neutral density (ND) filter

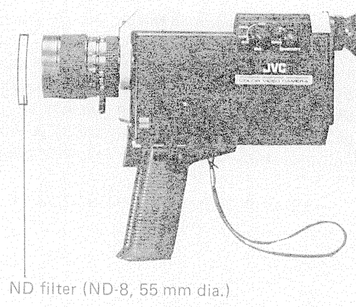


Fig. 1-26

When the IRIS indicator lamp continues lighting green or flashes too frequently in the AUTO mode, or when it fails to extinguish in the MANUAL mode even when the IRIS knob is fully turned toward CLOSE, fit an ND filter on the front of the lens to reduce the amount of entering light.

When shooting in snowy mountains or by sea shores in fine weather, be sure to use the ND filter. ND filters are available at ordinary camera shops.

1.13.3 Subject illumiantion

Only when the lighting on the subject is optimal, may the best color pictures be obtained.

Illuminance
- The GX-33E/GX-66E is designed to provide the best pictures under the condition of a 700 lux illuminance, 70% reflection and 3 000 K color temperature.
- Although the reference illuminance is 700 lux, lighting of 100 lux can be utilized with good results if the SENSITIVITY switch is set to "UP". Less than 100 lux will provide under-exposed dark pictures. For more than 70 000 lux illuminance a neutral filter is required to reduce the amount of light.

Lighting equipment

It is true that the more available lighting devices, the better. However, for home use there is no need to have such elaborate lighting equipment as is used in professional studios. Generally, two 500 W tungsten bulbs (or halogen bulbs) for photography may be sufficient. Or, if available, an additional flood light for illuminating the whole room and an additional spot light for illuminating the subject will provide better results.

- Color temperatures of the lighting equipment

  If lighting devices having different color temperatures are used together, faithful reproduction of the subject colors may not be possible. For example, do not use fluorescent lighting together with tungsten or halogen lighting. It is desirable to use lighting devices, all having a color temperature of 3 200 K.

- Points to be remembered
  - A key point for obtaining good color pictures is to uniformly illuminate the scene to be shot. Try to apply light not only to the subject but also its surroundings. Exercise care to avoid too dark or too bright background.
  - Reflections of light from a window glass or mirror will degrade pictures. If there is reflecting object, move it away from the subject or shift the lighting position or the camera angle.
  - Secure the lighting equipment if possible. A hand-held lighting device is likely to move and cause the shadow of the subject to move. This will result in pictures which appear unstable.
  - If natural light is mixed with artificial light, which is likely to happen next to windows, correct colors of the subject cannot be reproduced. It is recommended in such cases that curtains in the room be closed to shut out light from outside.

Types of lighting and their color temperatures

Lighting	Color temperature
Household tungsten lamp	2 800 K
Tungsten lamp for photography	3 200 K
Halogen lamp	3 200 K
Blue light	5 000 K
Fluorescent light	
Warm white	3 500 K
White	4 500 K
Daylight	6 500 K

1.14 IN CASE OF DIFFICULTY

What may initially appear to be trouble is not always a real problem. Make sure first . . .

Symptoms	Check points
Tape does not start when the camera's recording switch is pressed in.	Is the recorder's PAUSE key engaged? Release it by pressing again. Is the switch of the connected remote control unit in the ON position? Switch it OFF or disconnect the unit.
Picture colors greatly differ from actual subject colors.	Have you adjusted the COLOR COMPENSATOR switch to correspond with the lighting? See page 1-9.
IRIS indicator red lamp does not go off under fairly bright lighting.	Is the IRIS knob near to the CLOSE position in the Manual mode? Set it to AUTO or turn toward OPEN.
IRIS indicator lamp lighting green does not go off even when the IRIS knob is turned to the CLOSE position.	Fit an ND filter on the lens. See page 1-11.
Recorded sounds differ from those aimed at by the camera.	Is a microphone connected to the microphone jack of the recorder? Disconnect it.
Playback pictures are not in focus though focusing was done accurately.	Have you adjusted the diopter control accurately to your eyesight? See page 1-7.

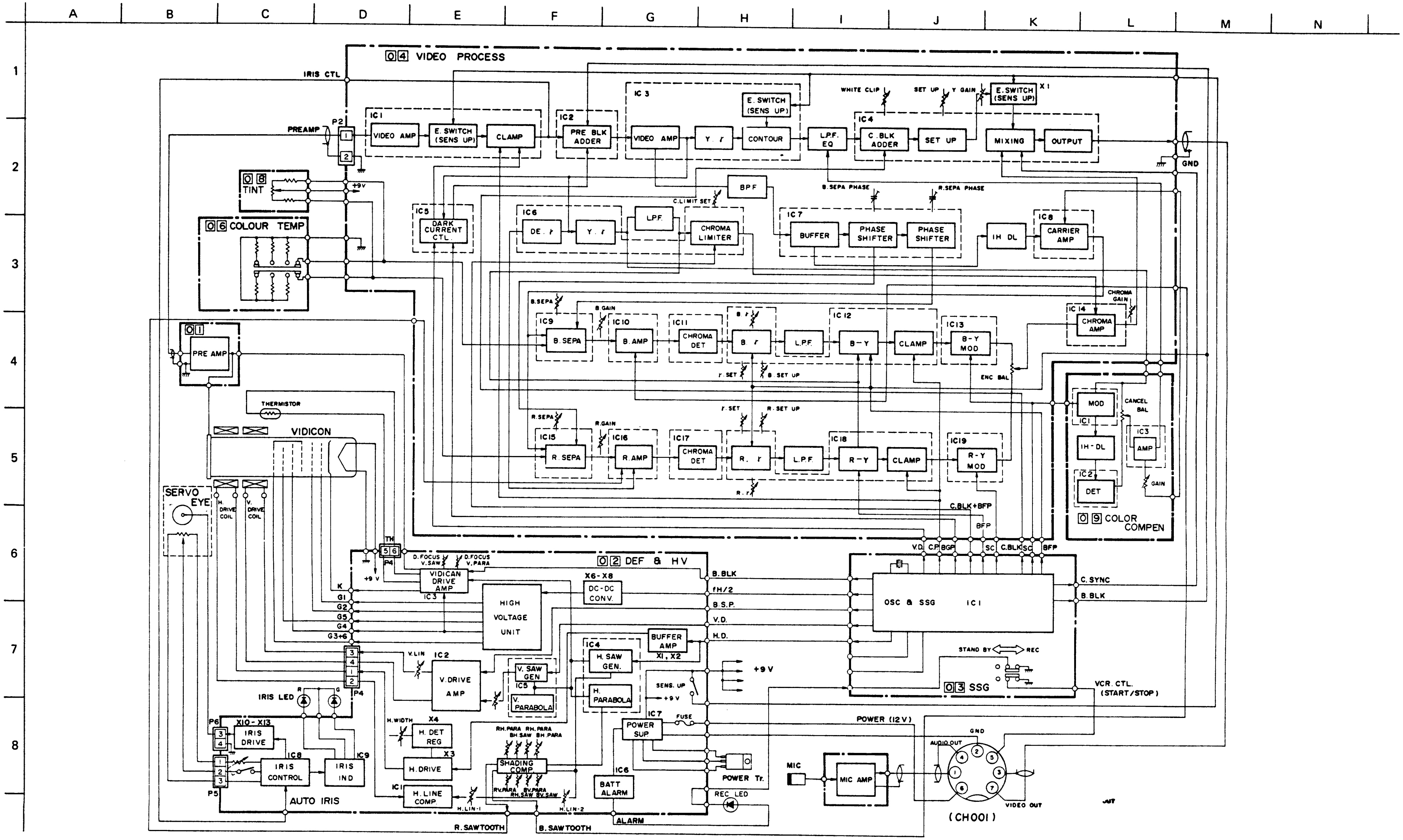
1.15 SPECIFICATIONS

Colour pickup system: Single-carrier frequency multiplex system
Pickup tube: Single-tube, 17 mm (2/3") electrostatic focus, electromagnetic deflection vidicon tube
Scanning system: 625 lines, 2:1 interlaced PAL-type output
Lens
GX-33E: f/1.9, 3X zoom lens (f = 15–45 mm)
Auto-iris control
Filter diameter; 55 mm
GX-66E: f/1.9, 6X zoom lens (f = 12.5–75 mm)
Auto-iris control and macro
Filter diameter; 55 mm
Viewfinder: Through-the-lens optical viewfinder, Split-image focusing with diopter adjustment
Colour compensation: Indoor/Morning & Evening/Outdoor switchable with manual adjustment
Video output: 1 Vp-p, 75 Ω
Microphone: Built-in electret condenser microphone, omni-directional –64 dB/1 kΩ
Audio output: –20 dB, LOW impedance
Horizontal resolution: 250 lines
Video S/N ratio: 45 dB (Rohde & Schwarz noise meter)
Minimum practical illumination: 100 lux (Sensitivity switch at "UP")
Operating temperature: 0°C ~ 40°C
Power consumption: 12 V DC, 7.5 watts
Weight
GX-33E: 1.4 kg (with zoom lens and handgrip)
GX-66E: 1.5 kg (with zoom lens and handgrip)
Dimensions
GX-33E: 77(W) x 120(H) x 269(D) mm (without handgrip)
77(W) x 225(H) x 269(D) mm (with handgrip and without lens hood)
GX-66E: 77(W) x 120(H) x 283(D) mm (without handgrip)
77(W) x 225(H) x 283(D) mm (with handgrip and without lens hood)

Design and specifications subject to change without notice.

SECTION 2
DIAGRAMS AND CIRCUIT BOARDS

2.1 BLOCK DIAGRAM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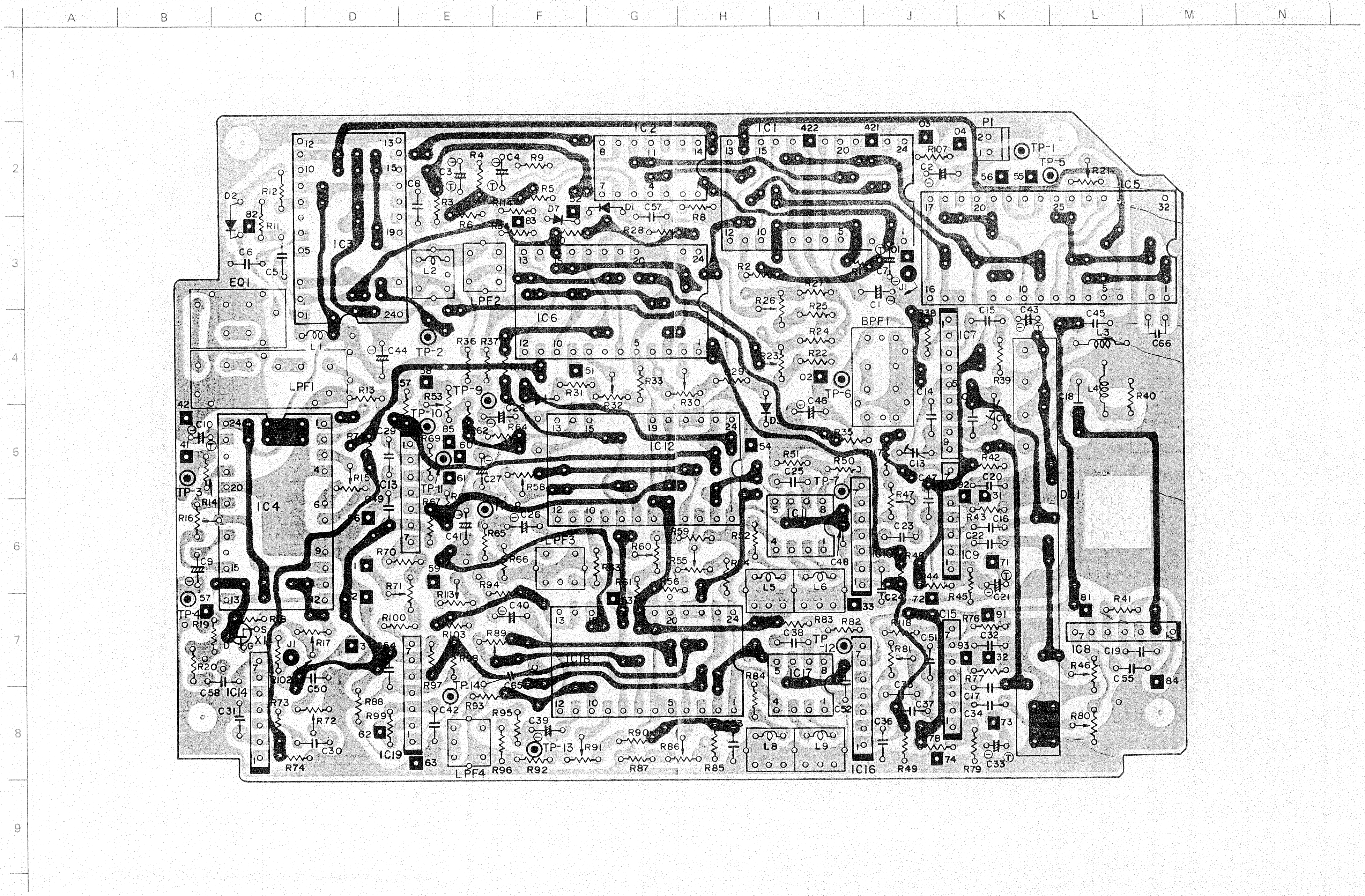
04 VIDEO PROCESS
IRIS CTL
PREAMP
P2
IC1
VIDEO AMP
E. SWITCH (SENS UP)
CLAMP
IC2
PRE BLK ADDER
IC3
VIDEO AMP
Y γ
CONTOUR
E. SWITCH (SENS UP)
L.P.F. EQ
WHITE CLIP
SET UP
Y GAIN
E. SWITCH (SENS UP)
X1
IC4
C.BLK ADDER
SET UP
MIXING
OUTPUT
GND
08 TINT
+9V
06 COLOUR TEMP
BPF
C.LIMIT SET
B.SEPA PHASE
R.SEPA PHASE
IC5
DARK CURRENT CTL
IC6
DE. γ
Y. γ
L.P.F.
CHROMA LIMITER
IC7
BUFFER
PHASE SHIFTER
PHASE SHIFTER
IH DL
IC8
CARRIER AMP
CHROMA GAIN
IC14
CHROMA AMP
B.SEPA
B.GAIN
IC9
B.SEPA
IC10
B.AMP
IC11
CHROMA DET
B γ
L.P.F.
IC12
B-Y
CLAMP
IC13
B-Y MOD
γ SET
B.SET UP
ENC BAL
01
PRE AMP
THERMISTOR
VIDICON
R.SEPA
R.GAIN
γ SET
R.SET UP
IC15
R.SEPA
IC16
R.AMP
IC17
CHROMA DET
R. γ
L.P.F.
IC18
R-Y
CLAMP
IC19
R-Y MOD
R. γ
MOD
CANCEL BAL
IC1
IH-DL
IC3
AMP
IC2
DET
GAIN
09 COLOR COMPEN
C.BLK+BFP
BFP
SERVO EYE
H. DRIVE COIL
V. DRIVE COIL
TH
5 6
P4
D.FOCUS V.SAW
D.FOCUS V.PARA
+9 V
VIDICAN DRIVE AMP
IC3
02 DEF & HV
X6-X8
DC-DC CONV.
HIGH VOLTAGE UNIT
K
G1
G2
G5
G4
G3+6
V.D
CP
BGP
SC
C.BLK
SC
BFP
B.BLK
fH/2
B.S.P.
V.D.
H.D.
OSC & SSG IC1
C. SYNC
B. BLK
BUFFER AMP
X1, X2
IC4
H. SAW GEN.
H. PARABOLA
V.LIN
IC2
V.DRIVE AMP
V. SAW GEN
IC5
V. PARABOLA
SENS. UP
+9 V
+9 V
STAND BY
REC
03 SSG
VCR. CTL. (START/STOP)
IRIS LED
R
G
P4
P6
X10-X13
IRIS DRIVE
IC8
IRIS CONTROL
IC9
IRIS IND
P5
AUTO IRIS
H. WIDTH
X4
H. DET REG
X3
H. DRIVE
IC1
H. LINE COMP.
H.LIN-1
RH.PARA RH.PARA
BH.SAW BH.PARA
SHADING COMP
RV.PARA BV.PARA
RH.SAW BV.SAW
H.LIN-2
IC7
POWER SUP
FUSE
IC6
BATT ALARM
POWER Tr.
REC LED
ALARM
POWER (12V)
R.SAWTOOTH
B.SAWTOOTH
MIC
MIC AMP
GND
AUDIO OUT
VIDEO OUT
(CH001)

2.2 VIDEO PROCESS CIRCUIT BOARD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IC12
IC14
IC15
IC16
IC17
IC18
IC19
EQ1
LPF1
LPF2
LPF3
LPF4
BPF1
L1
L2
L3
L4
L5
L6
L8
L9
P1
TP-1
TP-2
TP-3
TP-4
TP-5
TP-6
TP-7
TP-9
TP-10
TP-11
TP-12
TP-13
TP-14
D1
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D7
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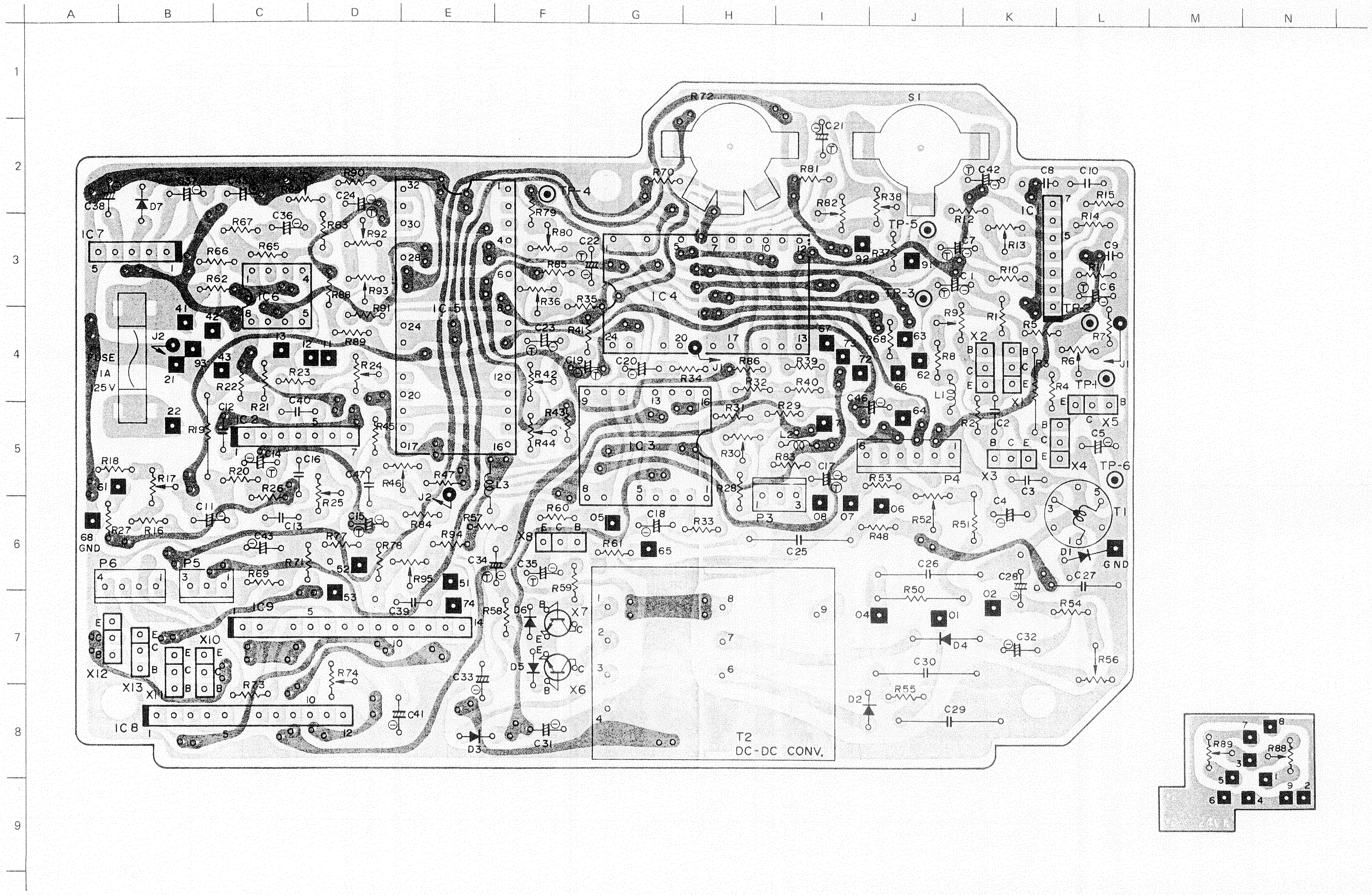
X1
DL1

2.5 DEFLECTION AND HIGH VOLTAGE CIRCUIT BOARD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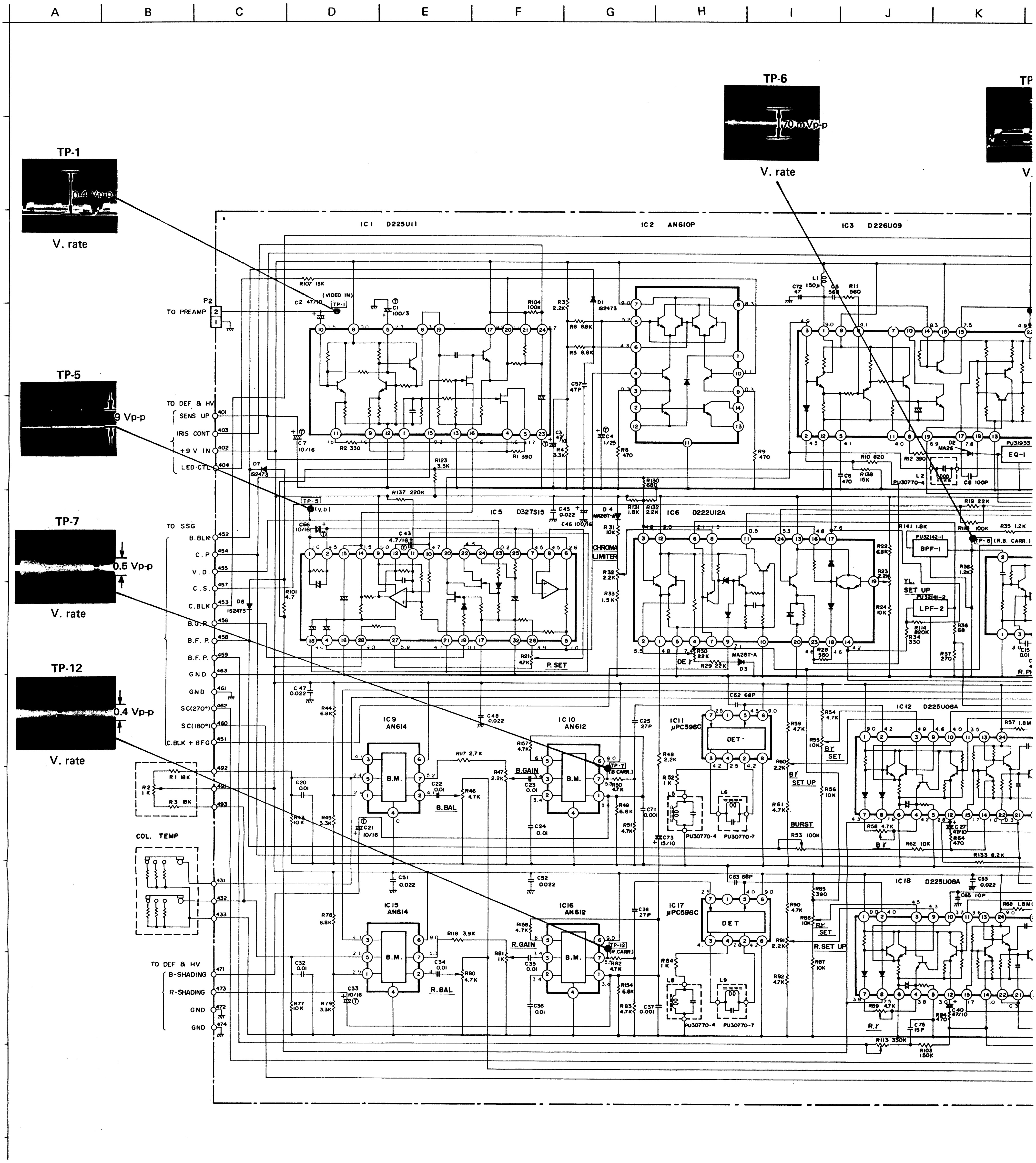
R72
S1
C21
R70
R81
C42
C8
C10
R90
C38
D7
C24
TP-4
R79
R82
R38
R12
IC
R15
R14
IC7
R67
C36
R63
R92
R80
C22
TP-5
R13
C9
R66
R65
R28
R85
R37
C7
R10
C6
R62
IC6
R88
R93
R36
R35
IC4
C1
TP-3
R91
IC5
R89
R41
C23
R9
R1
R5
TP-2
R7
FUSE
1A
125V
J2
R23
R24
R22
R21
C40
C19
C20
R86
R34
R39
R32
R40
R68
X2
R8
R6
J1
R42
TP-1
R4
C12
IC2
R19
R45
R43
R31
R29
C46
L1
X5
R44
IC3
L2
R2
C2
R18
C14
C16
R20
C47
R46
R47
R30
R83
C17
C5
X4
TP-6
R17
R26
R25
L3
R53
P4
X3
C3
T1
C11
R28
P3
C4
C13
C15
R84
R57
R60
C18
R33
R52
R51
R27
R16
68 GND
C43
R77
R78
R94
X8
R61
C25
R48
D1
GND
P6
P5
R71
C34
C35
C26
C27
R69
R95
R59
R50
C28
IC9
C39
R58
D6
X7
R54
X10
X12
X13
X11
R74
R73
D5
X6
C33
C41
C30
C32
R56
D4
R55
D2
IC8
C29
D3
C31
T2
DC-DC CONV.
R89
R88

3 VIDEO PROCESS SCHEMATIC DIAGRAM


A
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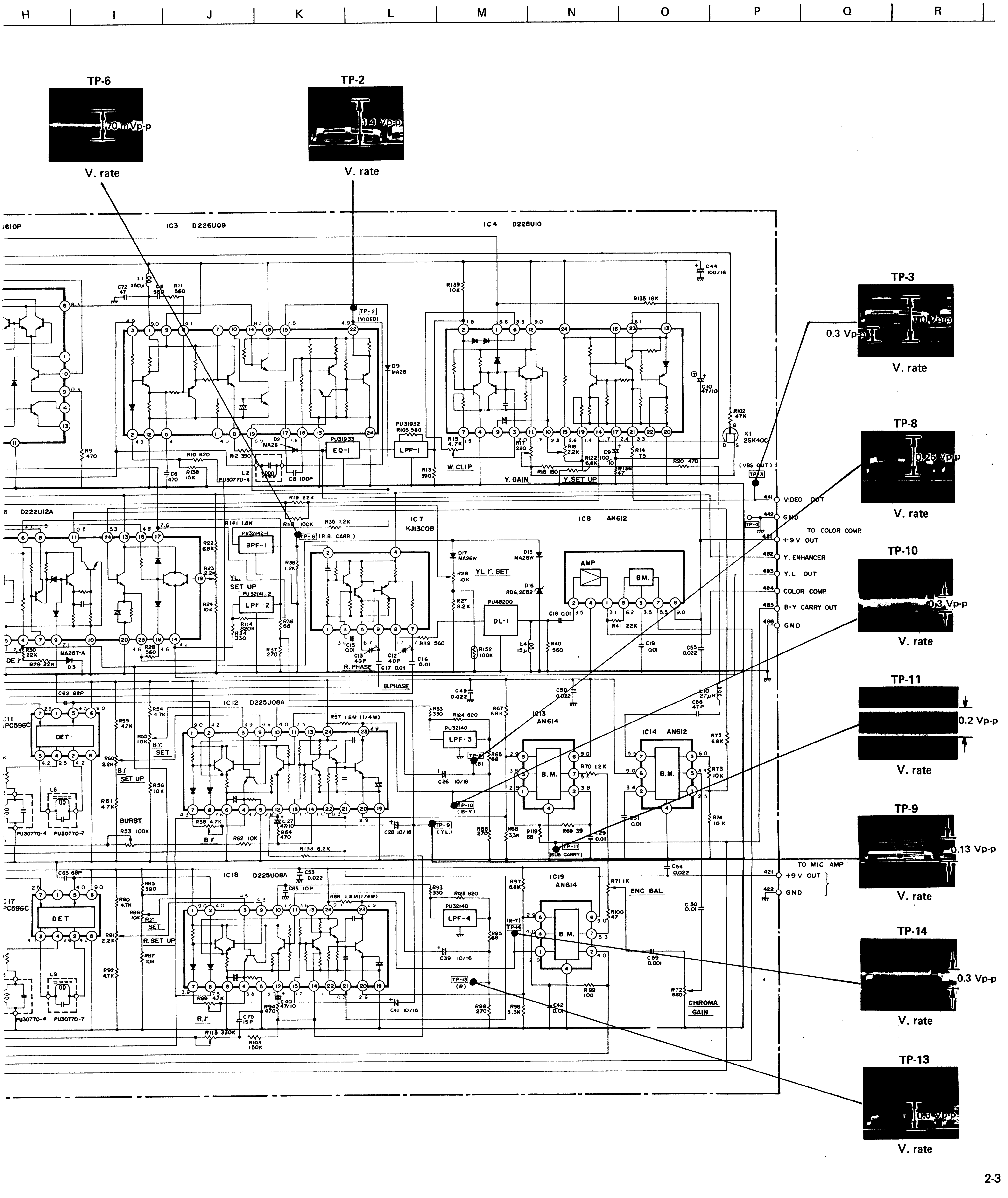
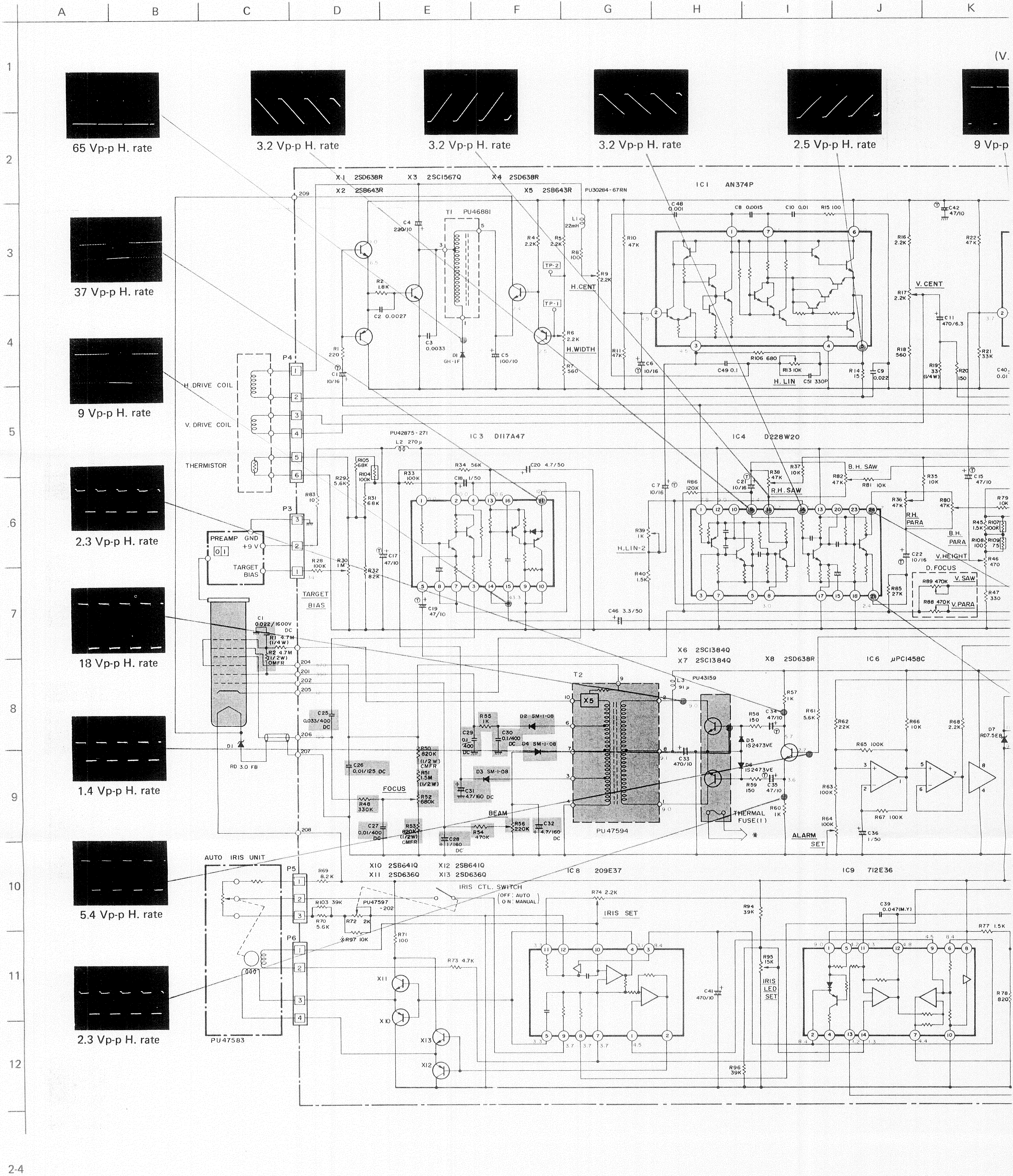
J
K
TP-1
0.4 Vp-p
V. rate
TP-5
9 Vp-p
TP-7
0.5 Vp-p
V. rate
TP-12
0.4 Vp-p
V. rate
TP-6
70 mVp-p
V. rate
IC1 D225U11
IC2 AN610P
IC3 D226U09
IC5 D327S15
IC6 D222U12A
IC9 AN614
IC10 AN612
IC11 μPC596C
IC12 D225U08A
IC15 AN614
IC16 AN612
IC17 μPC596C
IC18 D225U08A
P2
TO PREAMP
(VIDEO IN)
TP-1
TO DEF & HV
SENS UP
IRIS CONT
+9 V IN
LED-CTL
TO SSG
B.BLK
C.P
V.D
C.S
C.BLK
B.G.P.
B.F.P.
B.F.P.
GND
GND
SC(270°)
SC(180°)
C.BLK + BFG
COL. TEMP
TO DEF & HV
B-SHADING
R-SHADING
GND
GND
TP-5
(V.D)
P. SET
CHROMA LIMITER
DE γ
YL SET UP
BPF-1
LPF-2
PU32142-1
PU32141-2
PU31933
EQ-1
TP-6 (R.B. CARR.)
B.M.
B.GAIN
B.BAL
TP-7
(B CARR.)
R.GAIN
R.BAL
TP-12
(R CARR.)
DET
Bγ SET
Bγ SET UP
BURST
Bγ
Rγ SET
R.SET UP
Rγ
PU30770-4
PU30770-7
R.P


H I J K L M N O P Q R
TP-6
70 mVp-p
V. rate
TP-2
1.4 Vp-p
V. rate
TP-3
0.3 Vp-p
1.0 Vp-p
V. rate
TP-8
0.25 Vp-p
V. rate
TP-10
0.3 Vp-p
V. rate
TP-11
0.2 Vp-p
V. rate
TP-9
0.13 Vp-p
V. rate
TP-14
0.3 Vp-p
V. rate
TP-13
0.3 Vp-p
V. rate
IC3 D226U09
IC4 D228U10
IC7 KJ13C08
IC8 AN612
IC12 D225U08A
IC13 AN614
IC14 AN612
IC18 D225U08A
IC19 AN614
D222U12A
IC11 µPC596C
IC17 µPC596C
DET
EQ-1
LPF-1
BPF-1
LPF-2
LPF-3
LPF-4
DL-1
AMP
B.M.
X1 2SK40C
W. CLIP
Y. GAIN
Y. SET UP
YL. SET UP
YL γ. SET
R. PHASE
B. PHASE
Bγ SET
Bγ SET UP
BURST
Bγ
Rγ SET
R. SET UP
R.γ
ENC BAL
CHROMA GAIN
TP-2 (VIDEO)
TP-6 (R.B. CARR.)
TP-8 (B)
TP-10 (B-Y)
TP-9 (YL)
TP-11 (SUB CARRY)
TP-14 (R-Y)
TP-13 (R)
TP-3 (VBS OUT)
TP-4
441 VIDEO OUT
442 GND
481 +9 V OUT
482 Y. ENHANCER
483 Y.L OUT
484 COLOR COMP.
485 B-Y CARRY OUT
486 GND
TO COLOR COMP.
TO MIC AMP
421 +9 V OUT
422 GND
PU31933
PU31932
PU32142-1
PU32141-2
PU48200
PU32140
PU30770-4
PU30770-7
L6
L9
D9 MA26
D2 MA26
D17 MA26W
D15 MA26W
D16 RD6.2EB2
D3 MA26T-A

2.4 DEFLECTION AND HIGH VOLTAGE SCHEMATIC DIAGRAM



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(V.
65 Vp-p H. rate
3.2 Vp-p H. rate
3.2 Vp-p H. rate
3.2 Vp-p H. rate
2.5 Vp-p H. rate
9 Vp-p
37 Vp-p H. rate
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2.3 Vp-p H. rate
18 Vp-p H. rate
1.4 Vp-p H. rate
5.4 Vp-p H. rate
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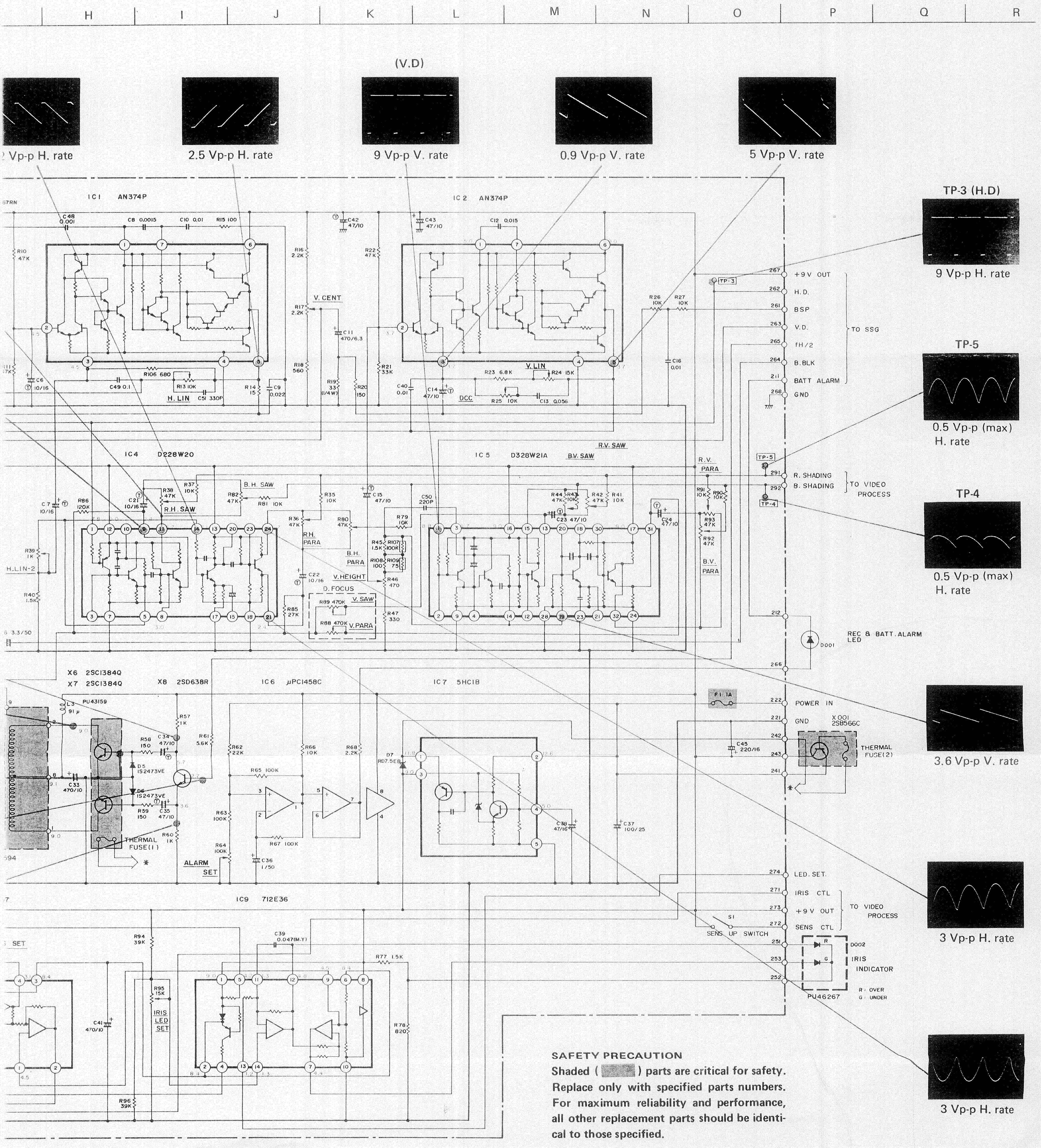
X1 2SD638R
X2 2SB643R
X3 2SC1567Q
X4 2SD638R
X5 2SB643R
PU30284-67RN
IC1 AN374P
T1 PU46881
H.CENT
H.WIDTH
H.LIN
V.CENT
TP-1
TP-2
H. DRIVE COIL
V. DRIVE COIL
THERMISTOR
P4
P3
PREAMP
GND
+9 V
TARGET BIAS
PU42875-271
IC3 D117A47
IC4 D228W20
R.H.SAW
B.H. SAW
R.H. PARA
B.H. PARA
V.HEIGHT
D. FOCUS
V. SAW
V. PARA
H.LIN-2
X6 2SC1384Q
X7 2SC1384Q
X8 2SD638R
IC6 μPC1458C
T2
PU43159
PU47594
FOCUS
BEAM
THERMAL FUSE (1)
ALARM SET
RD 3.0 FB
AUTO IRIS UNIT
P5
P6
PU47583
PU47597-202
X10 2SB641Q
X11 2SD636Q
X12 2SB641Q
X13 2SD636Q
IRIS CTL. SWITCH
(OFF: AUTO
ON: MANUAL)
IC8 209E37
IRIS SET
IC9 712E36
IRIS LED SET


H
I
J
K
L
M
N
O
P
Q
R
(V.D)
2 Vp-p H. rate
2.5 Vp-p H. rate
9 Vp-p V. rate
0.9 Vp-p V. rate
5 Vp-p V. rate
TP-3 (H.D)
9 Vp-p H. rate
TP-5
0.5 Vp-p (max) H. rate
TP-4
0.5 Vp-p (max) H. rate
3.6 Vp-p V. rate
3 Vp-p H. rate
3 Vp-p H. rate
IC1 AN374P
IC2 AN374P
IC4 D228W20
IC5 D328W21A
IC6 μPC1458C
IC7 5HC18
IC9 712E36
X6 2SC1384Q
X7 2SC1384Q
X8 2SD638R
V. CENT
H. LIN
V. LIN
DCC
H.LIN-2
R.H.SAW
B.H. SAW
R.H. PARA
B.H. PARA
V.HEIGHT
D.FOCUS
V. SAW
V. PARA
R.V. SAW
B.V. SAW
R.V. PARA
B.V. PARA
267 +9V OUT
262 H.D.
261 BSP
263 V.D.
265 fH/2
264 B.BLK
211 BATT ALARM
268 GND
TO SSG
291 R. SHADING
292 B. SHADING
TO VIDEO PROCESS
212
REC & BATT. ALARM LED
D001
266
F1 1A
222 POWER IN
221 GND
242
243
241
X001 2SB566C
THERMAL FUSE(2)
THERMAL FUSE(1)
PU43159
L3 91μ
ALARM SET
274 LED. SET.
271 IRIS CTL
273 +9 V OUT
272 SENS CTL
TO VIDEO PROCESS
S1 SENS UP SWITCH
251
253
252
D002
IRIS INDICATOR
R: OVER
G: UNDER
PU46267
IRIS LED SET

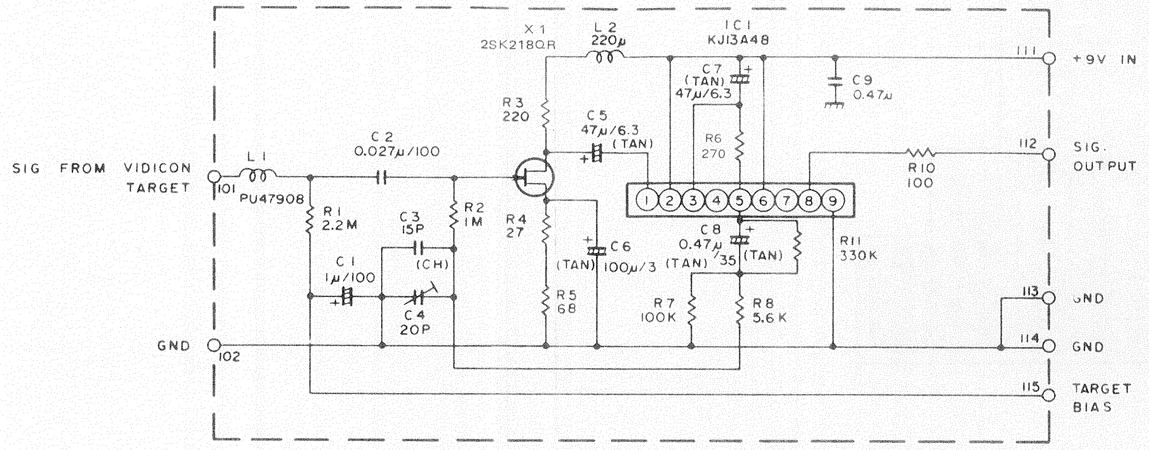
SAFETY PRECAUTION

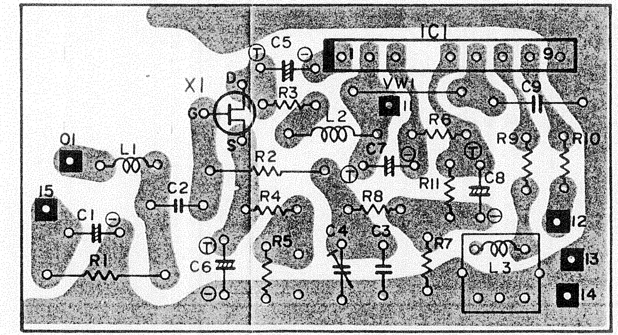
Shaded (▨) parts are critical for safety. Replace only with specified parts numbers. For maximum reliability and performance, all other replacement parts should be identical to those specified.

2.6 PRE AMP SCHEMATIC DIAGRAM AND CIRCUIT BOARD

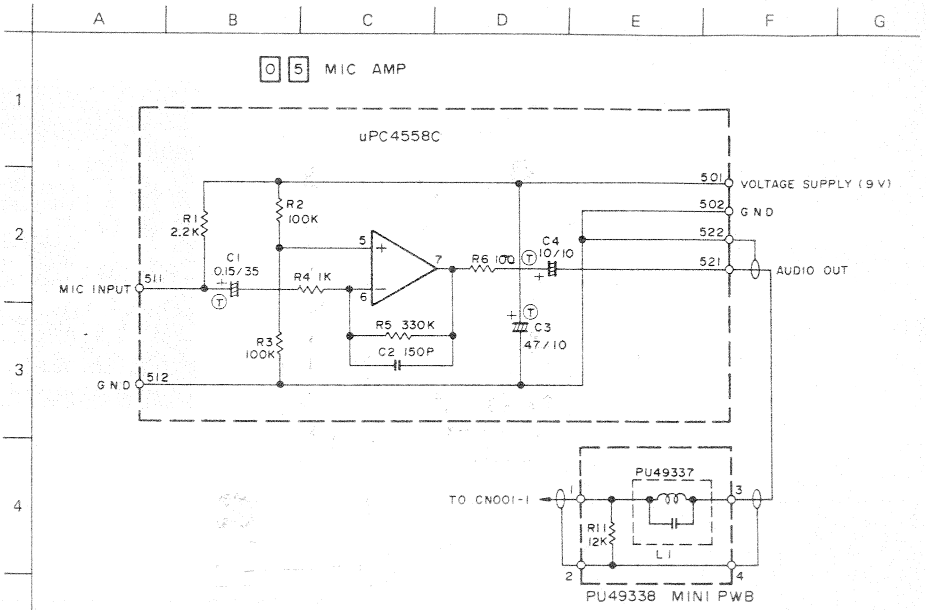
A B C D E F G H I J K L M N

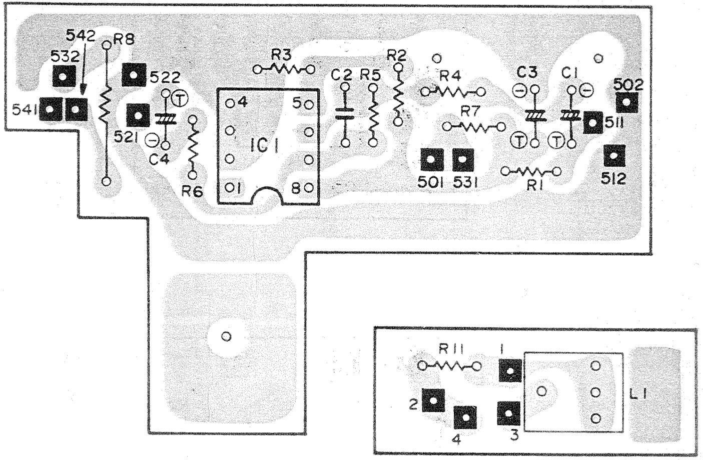
1 2 3 4 5 6 7 8 9


SIG FROM VIDICON TARGET
101
L1
PU47908
C2
0.027μ/100
R1
2.2M
C3
15P
(CH)
C1
1μ/100
C4
20P
R2
1M
GND
102
X1
2SK218QR
R3
220
R4
27
R5
68
L2
220μ
C5
47μ/6.3
(TAN)
C6
(TAN) 100μ/3
IC1
KJ13A48
C7
(TAN)
47μ/6.3
R6
270
1 2 3 4 5 6 7 8 9
C8
0.47μ/35
(TAN)
(TAN)
R7
100K
R8
5.6K
C9
0.47μ
R10
100
R11
330K
111
+9V IN
112
SIG. OUTPUT
113
GND
114
GND
115
TARGET BIAS

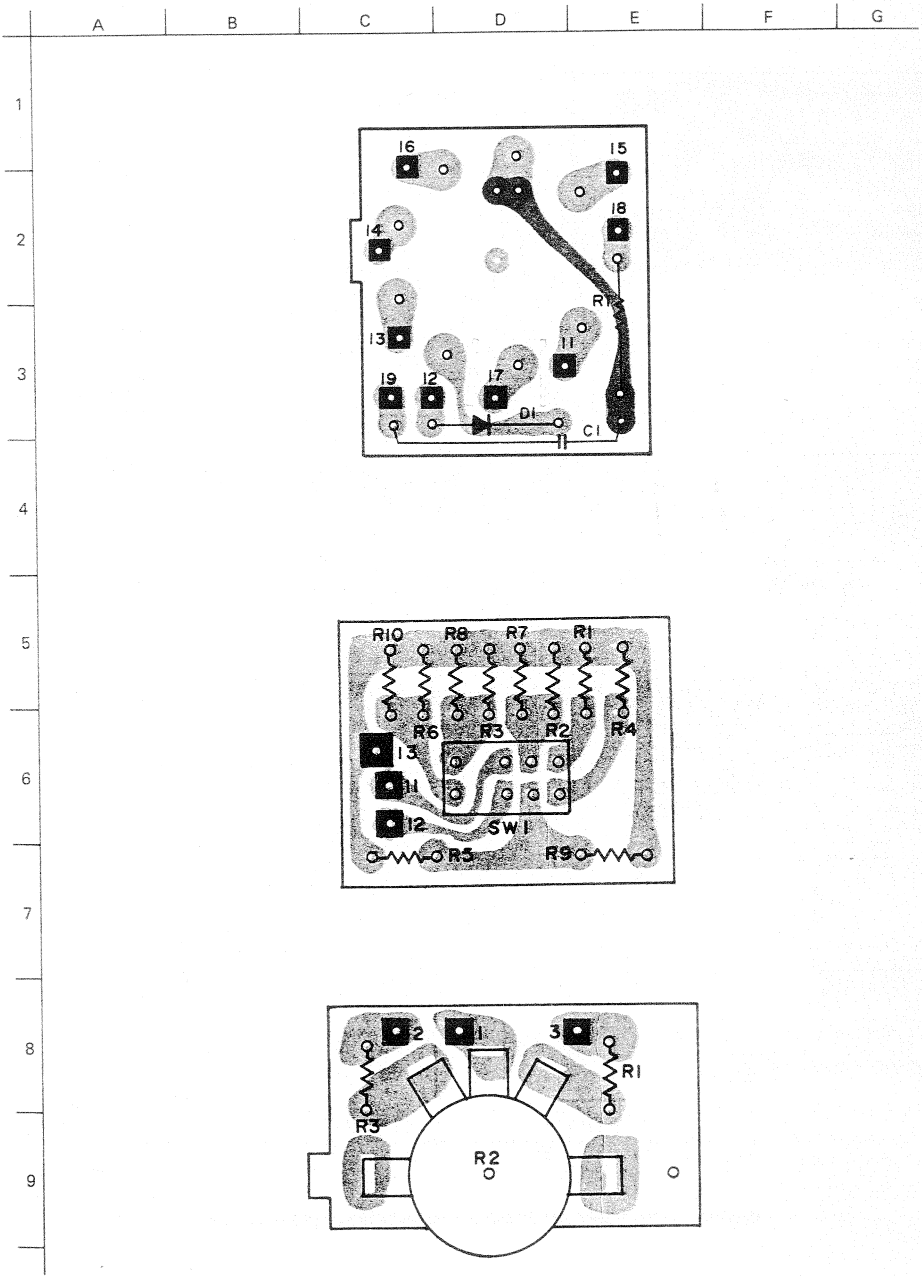

IC1
C5
X1
D
G
S
R3
L2
VW1
11
R6
C9
R9
R10
01
L1
C2
R2
C7
C8
R11
15
C1
R1
R4
R8
R5
C4
C3
R7
C6
L3
12
13
14

2.7 MIC AMP SCHEMATIC DIAGRAM AND CIRCUIT BOARD


A
B
C
D
E
F
G
1
2
3
4
5
0 5 MIC AMP
uPC4558C
501
VOLTAGE SUPPLY (9V)
502
GND
522
521
AUDIO OUT
R1 2.2K
R2 100K
R3 100K
R4 1K
R5 330K
R6 100
C1 0.15/35
C2 150P
C3 47/10
C4 10/10
5
6
7
MIC INPUT
511
GND
512
TO CN001-1
1
2
3
4
PU49337
R11 12K
L1
PU49338 MINI PWB


6
7
8
9
542
R8
532
522
541
521
C4
R6
R3
IC1
4
5
1
8
C2
R5
R2
R4
R7
C3
C1
502
511
501
531
R1
512
R11
1
2
4
3
L1

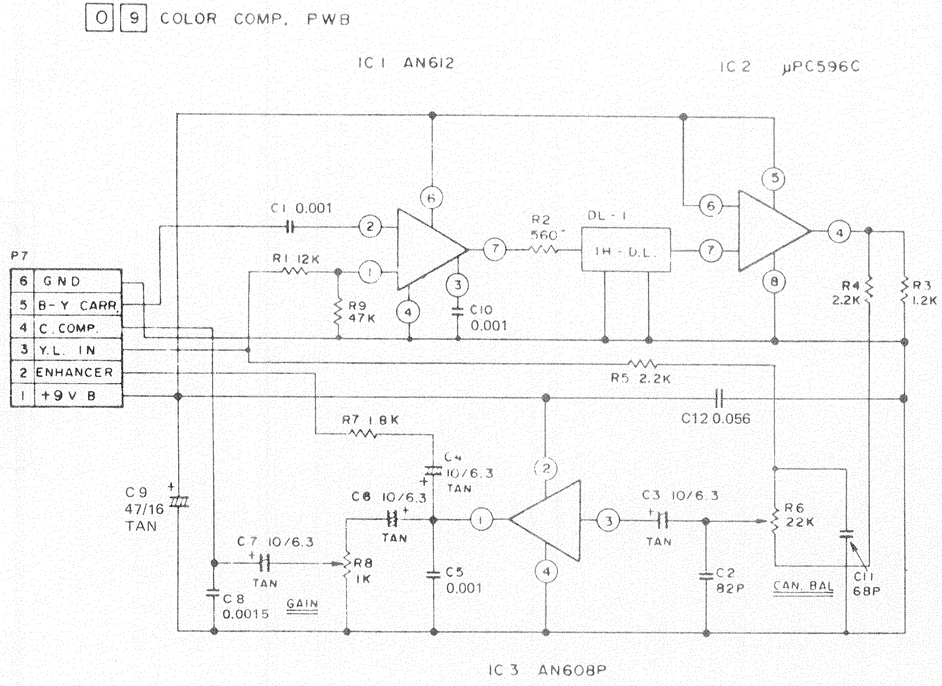
2.8 CONNECTOR BOARD SWITCH BOARD VR. BOARD

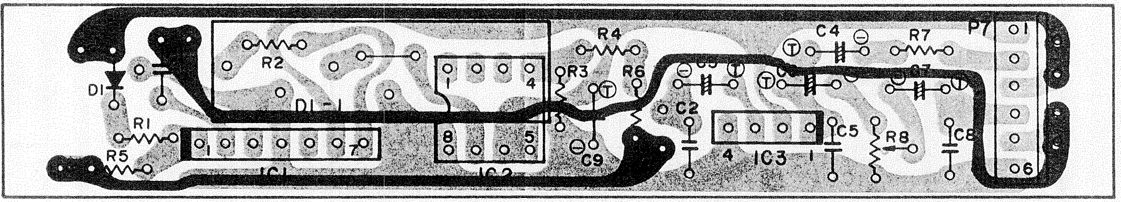

A
B
C
D
E
F
G
1
2
3
4
5
6
7
8
9
16
15
18
14
R1
13
11
19
12
17
D1
C1
R10
R8
R7
R1
R6
R3
R2
R4
13
11
12
SW1
R5
R9
2
1
3
R1
R3
R2

2.9 COLOR COMPENSATOR SCHEMATIC DIAGRAM AND CIRCUIT BOARD

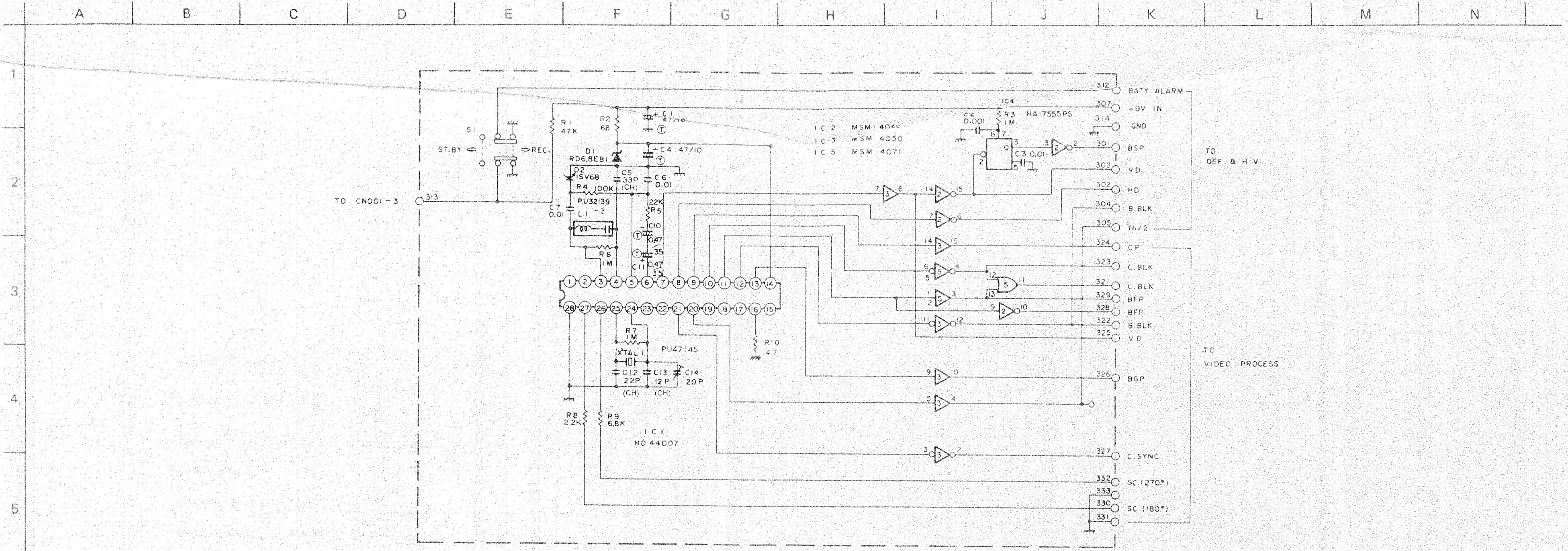
A B C D E F G H I J K L M N

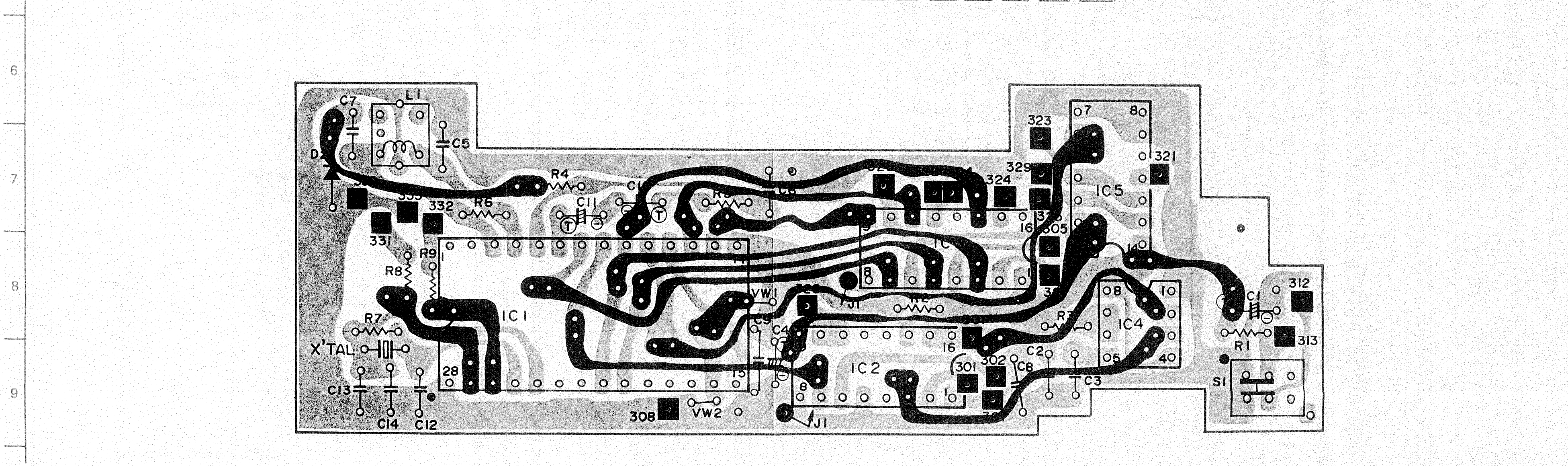
1 2 3 4 5 6 7 8 9


0 9 COLOR COMP. PWB
IC 1 AN612
IC 2 μPC596C
C1 0.001
R1 12K
R9 47K
C10 0.001
R2 560
DL - 1
1H - D.L.
R4 2.2K
R3 1.2K
P7
6 GND
5 B-Y CARR.
4 C.COMP.
3 Y.L. IN
2 ENHANCER
1 +9V B
R5 2.2K
C12 0.056
R7 1.8K
C4 10/6.3 TAN
C9 47/16 TAN
C8 10/6.3 TAN
C3 10/6.3 TAN
R6 22K
C7 10/6.3 TAN
R8 1K
GAIN
C8 0.0015
C5 0.001
C2 82P
CAN. BAL
C11 68P
IC 3 AN608P


D1
R1
R5
R2
DL-1
IC1
IC2
R4
R3
R6
C2
C9
C4
R7
P7
C5
R8
C8
IC3
1
4
5
8
6

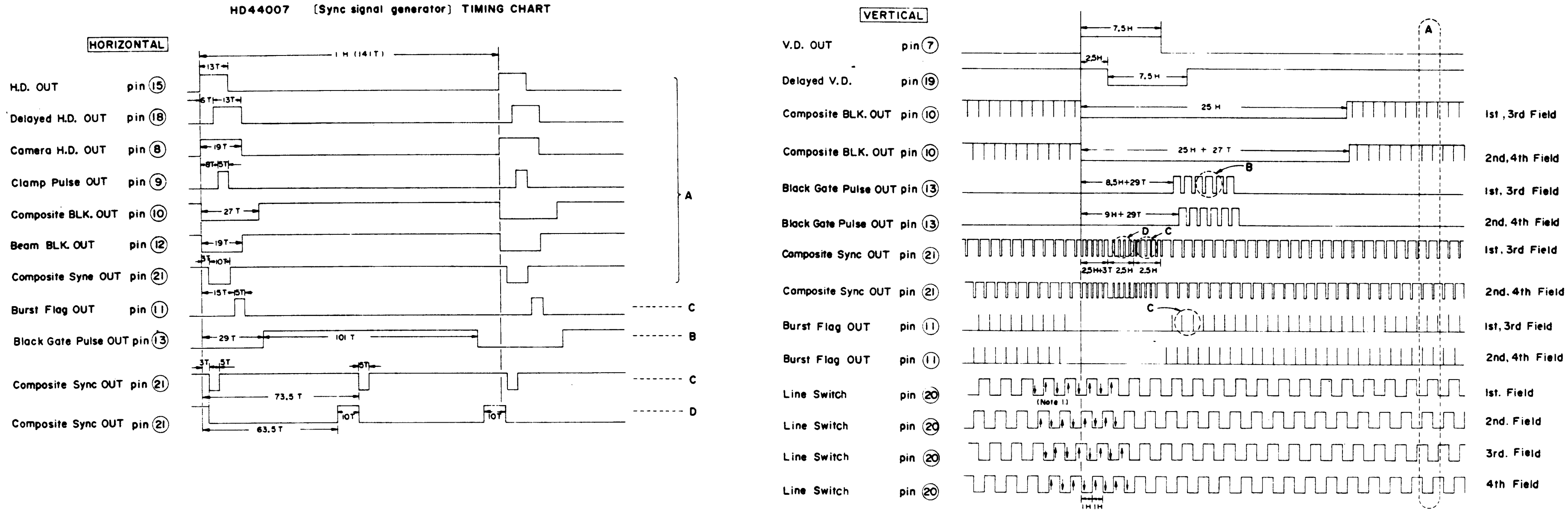
2.10 SSG SCHEMATIC DIAGRAM AND CIRCUIT BOARD


A
B
C
D
E
F
G
H
I
J
K
L
M
N
1
2
3
4
5
TO CN001-3
313
S1
ST.BY
REC.
R1 47K
R2 68
C1 47/10
D1 RD6.8EB1
C4 47/10
D2 1SV68
C5 33P (CH)
C6 0.01
R4 100K
PU32139 -3
L1
C7 0.01
22K R5
C10 0.47 35
C11 0.47 35
R6 1M
R7 1M
X'TAL1
C12 22P (CH)
C13 12P (CH)
C14 20P
PU47145
R8 2.2K
R9 6.8K
R10 47
IC1 HD44007
IC2 MSM 4049
IC3 MSM 4050
IC5 MSM 4071
IC4 HA17555PS
C2 0.001
R3 1M
C3 0.01
312 BATY ALARM
307 +9V IN
314 GND
301 BSP
303 VD
302 HD
304 B.BLK
305 fh/2
TO DEF. & H.V
324 CP
323 C.BLK
321 C.BLK
329 BFP
328 BFP
322 B.BLK
325 VD
TO VIDEO PROCESS
326 BGP
327 C.SYNC
332 SC (270°)
333
330 SC (180°)
331


6
7
8
9
C7
L1
C5
D2
R4
C1
C11
C6
332
R6
331
R8
R9
R7
X'TAL
C13
C14
C12
IC1
28
15
308
VW2
VW1
C9
C4
J1
R2
IC2
16
8
301
302
C2
C8
C3
IC4
R3
R1
S1
312
313
IC5
323
321
329
324
305
7
8
14
10
5
40

2.11 SSG TIMING CHART

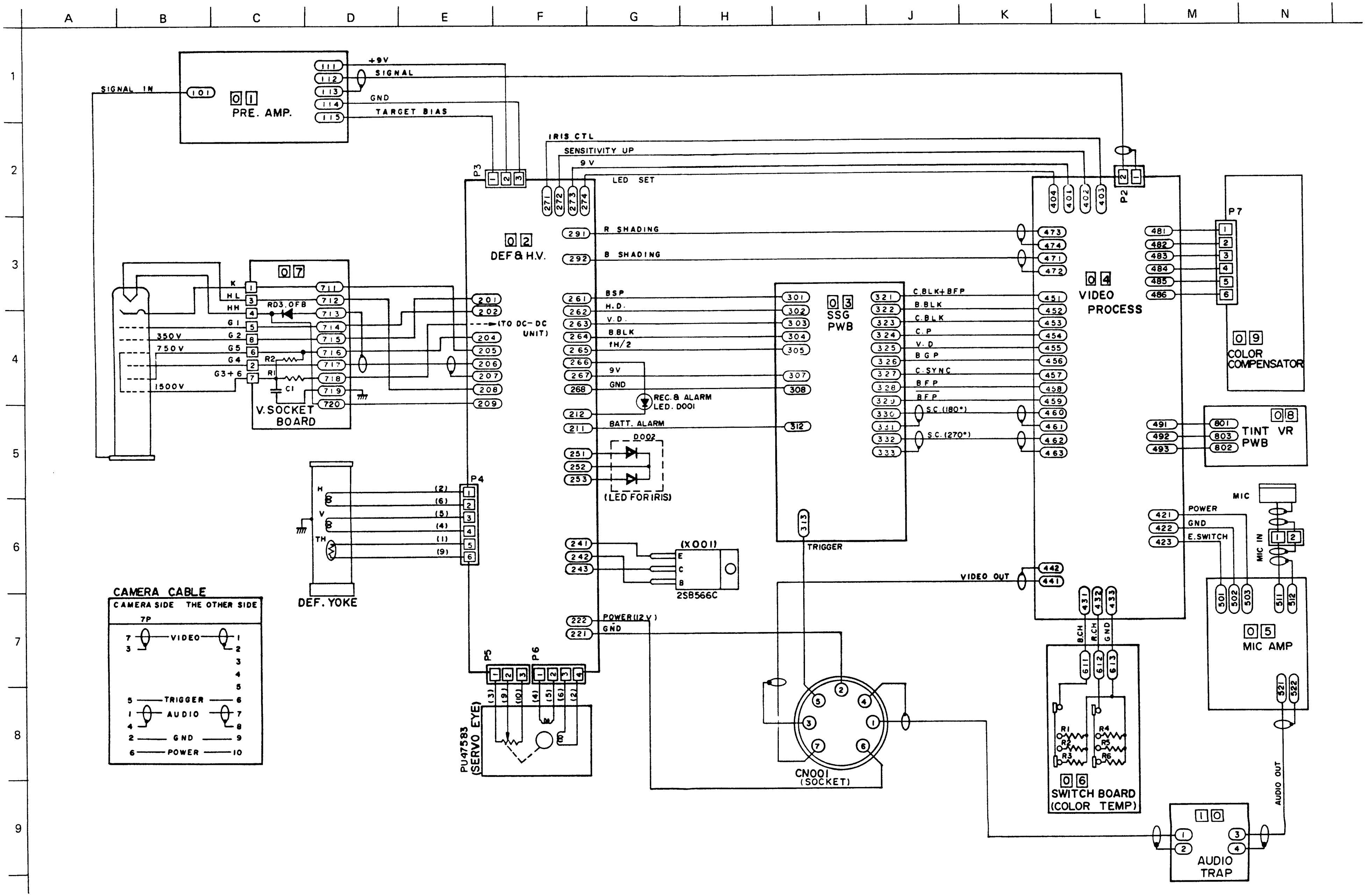
HD44007 [Sync signal generator] TIMING CHART


HORIZONTAL
H.D. OUT pin ⑮
Delayed H.D. OUT pin ⑱
Camera H.D. OUT pin ⑧
Clamp Pulse OUT pin ⑨
Composite BLK. OUT pin ⑩
Beam BLK. OUT pin ⑫
Composite Sync OUT pin ㉑
Burst Flag OUT pin ⑪
Black Gate Pulse OUT pin ⑬
Composite Sync OUT pin ㉑
Composite Sync OUT pin ㉑
1 H (141 T)
13T
6T
13T
19T
8T
5T
27 T
19T
3T
10T
15T
5T
29 T
101 T
3T
5T
5T
73.5 T
10T
10T
63.5 T
A
C
B
C
D
VERTICAL
V.D. OUT pin ⑦
Delayed V.D. pin ⑲
Composite BLK. OUT pin ⑩
Composite BLK. OUT pin ⑩
Black Gate Pulse OUT pin ⑬
Black Gate Pulse OUT pin ⑬
Composite Sync OUT pin ㉑
Composite Sync OUT pin ㉑
Burst Flag OUT pin ⑪
Burst Flag OUT pin ⑪
Line Switch pin ⑳
Line Switch pin ⑳
Line Switch pin ⑳
Line Switch pin ⑳
7.5H
2.5H
7.5 H
25 H
25 H + 27 T
8.5H+29 T
B
9H+ 29T
D
C
2.5H+3T 2.5H 2.5H
C
(Note 1)
1H 1H
A
1st, 3rd Field
2nd, 4th Field
1st, 3rd Field
2nd, 4th Field
1st, 3rd Field
2nd, 4th Field
1st, 3rd Field
2nd, 4th Field
1st. Field
2nd. Field
3rd. Field
4th Field

Note 1. ↑ and ↓ mean the phase of S.C. out at pin ㉖.
↑ means 90° and ↓ 270°, where the signal at pin ㉗
is regarded as 180° the standard degree.

$1\,H = 64.0\,\mu sec$
$1\,T = \frac{1}{141} H = 0.4539\,\mu sec$
$1\,V = \frac{625}{2} H = 20.0\,msec$

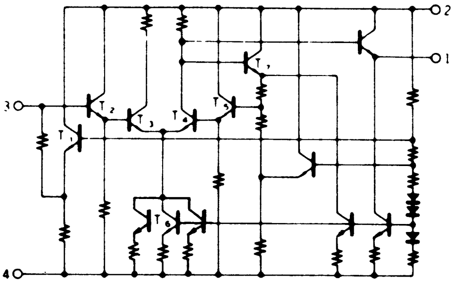
2.12 OVERALL WIRING



A B C D E F G H I J K L M N
1 2 3 4 5 6 7 8 9
01 PRE. AMP.
SIGNAL IN
101
111 +9V
112 SIGNAL
113
114 GND
115 TARGET BIAS
P3
IRIS CTL
SENSITIVITY UP
9V
LED SET
271 272 273 274
02 DEF & H.V.
291 R SHADING
292 B SHADING
261 BSP
262 H.D.
263 V.D.
264 B.BLK
265 fH/2
266
267 9V
268 GND
REC. & ALARM LED. D001
212
211 BATT. ALARM
251 252 253
D002
(LED FOR IRIS)
241 242 243
(X001)
E C B
2SB566C
222 POWER(12V)
221 GND
07
V.SOCKET BOARD
K HL HH G1 G2 G5 G4 G3+6
350V 750V 1500V
RD3.0FB
R2 R1 C1
711 712 713 714 715 716 717 718 719 720
201 202 (TO DC-DC UNIT) 204 205 206 207 208 209
P4
H V TH
(2) (6) (5) (4) (1) (9)
DEF. YOKE
P5 P6
(3) (9) (10) (4) (5) (6) (2)
PU47583 (SERVO EYE)
03 SSG PWB
301 302 303 304 305 307 308 312 313
TRIGGER
321 C.BLK+BFP
322 B.BLK
323 C.BLK
324 C.P
325 V.D
326 BGP
327 C.SYNC
328 BFP
329 BFP
330 S.C (180°)
331
332 S.C (270°)
333
CN001 (SOCKET)
VIDEO OUT
P2
404 401 402 403
04 VIDEO PROCESS
473 474 471 472
451 452 453 454 455 456 457 458 459 460 461 462 463
442 441
481 482 483 484 485 486
P7
09 COLOR COMPENSATOR
491 492 493
801 803 802
08 TINT VR PWB
421 POWER
422 GND
423 E.SWITCH
MIC
MIC IN
501 502 503 511 512
05 MIC AMP
521 522
AUDIO OUT
431 432 433
B.CH R.CH GND
611 612 613
R1 R2 R3 R4 R5 R6
06 SWITCH BOARD (COLOR TEMP)
10 AUDIO TRAP
1 2 3 4
CAMERA CABLE
CAMERA SIDE THE OTHER SIDE
7P
7 3 VIDEO 1 2
3 4 5
5 TRIGGER 6
1 4 AUDIO 7 8
2 GND 9
6 POWER 10

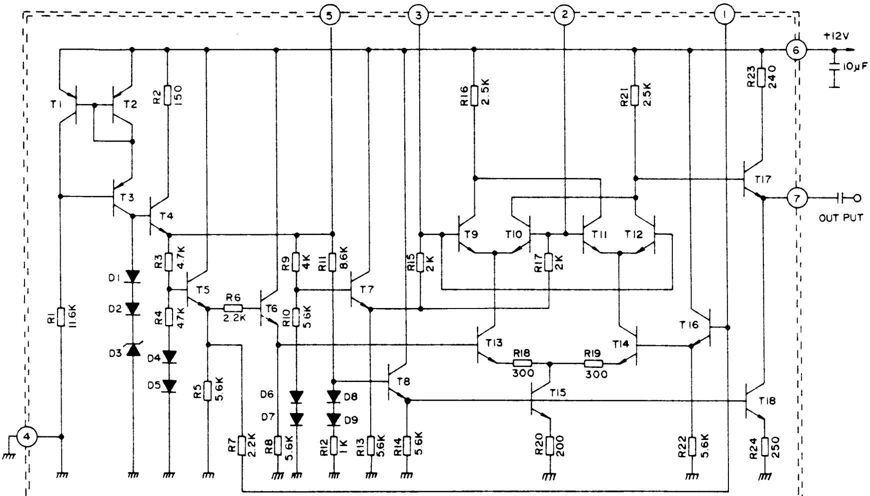
2.13 SCHEMATIC DIAGRAM OF INTEGRATED CIRCUITS

– AN608P –



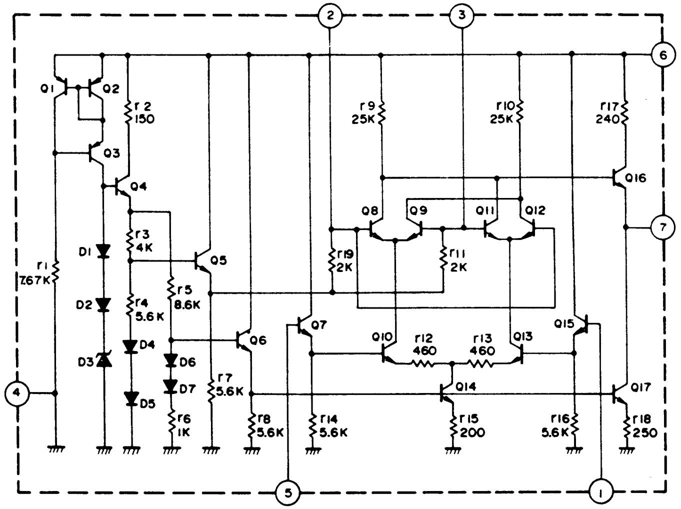
2
1
3
4
T1
T2
T3
T4
T5
T6
T7

– AN612 –



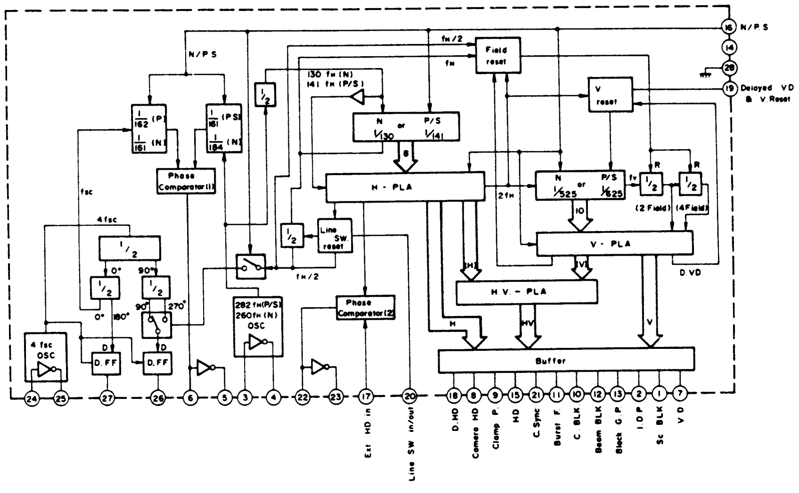
5
3
2
1
6
7
4
+12V
10µF
OUT PUT
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
T14
T15
T16
T17
T18
R1 11.6K
R2 150
R3 4.7K
R4 4.7K
R5 5.6K
R6 2.2K
R7 2.2K
R8 5.6K
R9 4K
R10 5.6K
R11 8.6K
R12 1K
R13 5.6K
R14 5.6K
R15 2K
R16 2.5K
R17 2K
R18 300
R19 300
R20 200
R21 2.5K
R22 5.6K
R23 240
R24 250
D1
D2
D3
D4
D5
D6
D7
D8
D9

– AN614 –



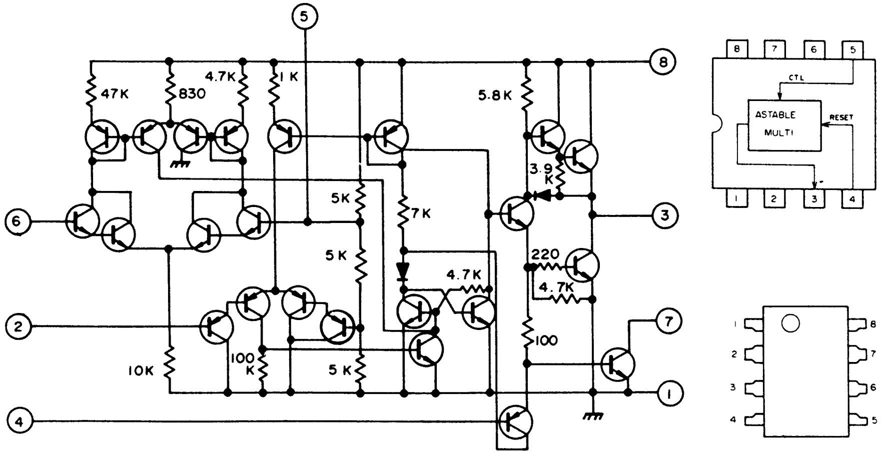
2
3
6
7
4
5
1
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
Q17
r1 7.67K
r2 150
r3 4K
r4 5.6K
r5 8.6K
r6 1K
r7 5.6K
r8 5.6K
r9 25K
r10 25K
r11 2K
r12 460
r13 460
r14 5.6K
r15 200
r16 5.6K
r17 240
r18 250
r19 2K
D1
D2
D3
D4
D5
D6
D7

–HD44007 –



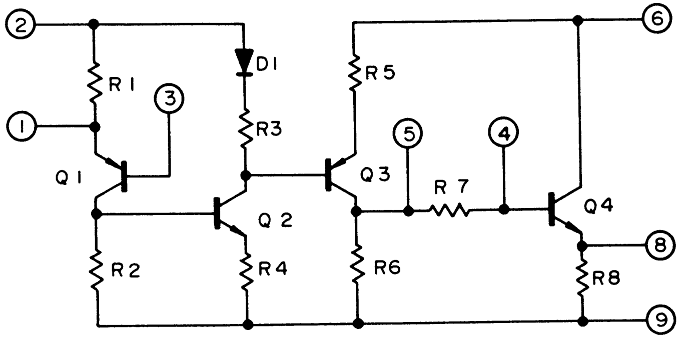
N/P S
N/P S
16
14
28
19
Delayed VD & V. Reset
fH/2
fH
Field reset
V reset
130 fH (N)
141 fH (P/S)
1/2
1/162 (P)
1/161 (N)
1/161 (PS)
1/184 (N)
N or P/S 1/130 1/141
8
Phase Comparator (1)
fsc
4fsc
H - PLA
2fH
N or P/S 1/525 1/625
fv
1/2
1/2
R
R
(2 Field)
(4 Field)
10
V - PLA
D.VD
Line SW reset
1/2
fH/2
0°
90°
180°
270°
282 fH(P/S)
260fH (N)
OSC
Phase Comparator (2)
H
V
H.V. - PLA
H
HV
V
Buffer
4 fsc OSC
D.FF
D.FF
D
D
24
25
27
26
6
5
3
4
22
23
17
20
18
8
9
15
21
11
10
12
13
2
1
7
Ext HD in
Line SW in/out
D.HD
Camera HD
Clamp P.
HD
C.Sync
Burst F.
C. BLK
Beam BLK
Black G.P.
I.D.P.
Sc BLK
V D

– HA17555PS –



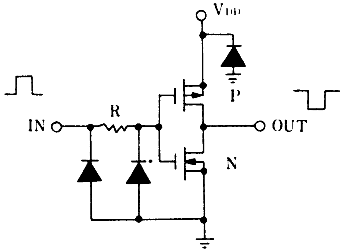
5
8
6
3
2
7
4
1
47K
830
4.7K
1 K
5.8K
3.9 K
5K
7K
5K
220
4.7K
4.7K
10K
100 K
5 K
100
8
7
6
5
CTL
ASTABLE MULTI
RESET
1
2
3
4
1
2
3
4
8
7
6
5

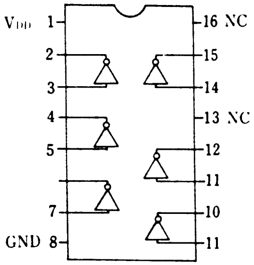
– KJ13A48 –



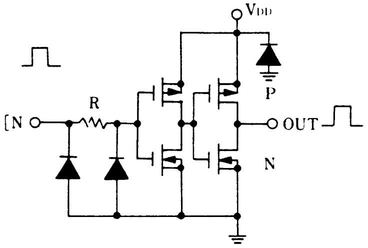
2
1
3
6
5
4
8
9
R1
R2
R3
R4
R5
R6
R7
R8
D1
Q1
Q2
Q3
Q4

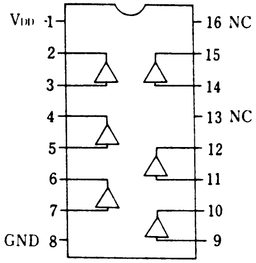
–MSM4049 –


VDD
IN
R
P
N
OUT

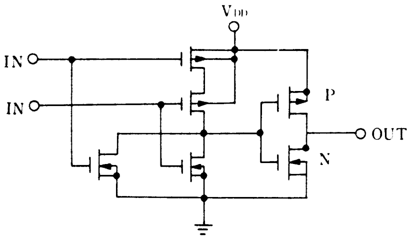

VDD 1
2
3
4
5
7
GND 8
16 NC
15
14
13 NC
12
11
10
11

– MSM4050 –


VDD
IN
R
P
N
OUT


VDD 1
2
3
4
5
6
7
GND 8
16 NC
15
14
13 NC
12
11
10
9

– MS4071 –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IN
IN
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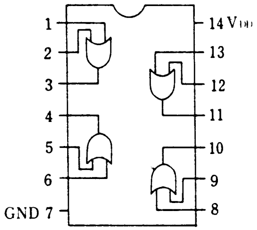
N
OUT


1
2
3
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5
6
GND 7
14 VDD
13
12
11
10
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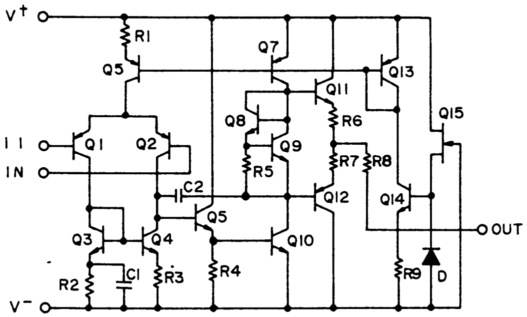
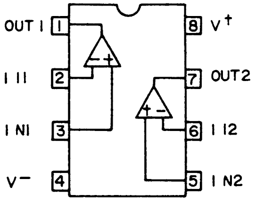
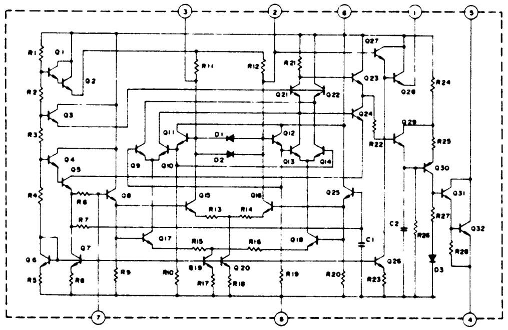
8

– UPC4558C –


V+
V−
I I
IN
R1
Q5
Q7
Q11
Q13
Q15
Q8
Q9
R6
Q1
Q2
R5
R7
R8
C2
Q12
Q14
Q3
Q4
Q5
Q10
R2
C1
R3
R4
R9
D
OUT


OUT I 1
I I1 2
I NI 3
V− 4
8 V+
7 OUT2
6 I I2
5 I N2

– UPC596C –



SECTION 3
ADJUSTMENT

3.1 TOOLS AND BASIC CONNECTIONS

3.1.1 Instruments and tools for camera adjustment

1. Reflecting type greyscale (GS-2) : Fig. 3-1(a)
2. Light fixture (halogen light) : 3200 K color temperature
3. Colored glass filters (V-42, V-R61) : Fig. 3-1(b)

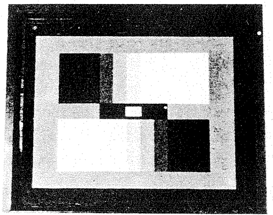


Fig. 3-1 (a)

3.1.2 Required test equipment

1. Color monitor (capable of underscan)
2. Camera adapter (GA-23E or GA-41E)
3. Oscilloscope (dual-trace with delay function)
4. Wideband oscillator (3.58 MHz)

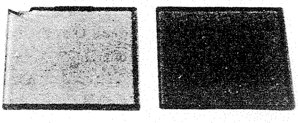


Fig. 3-1 (b)

3.1.3 Other recommended equipment

1. Light meter (with lux scale)
2. Air blower
3. Lens cleaning tissue
4. Gauze and alcohol

3.1.4 Basic connection diagram

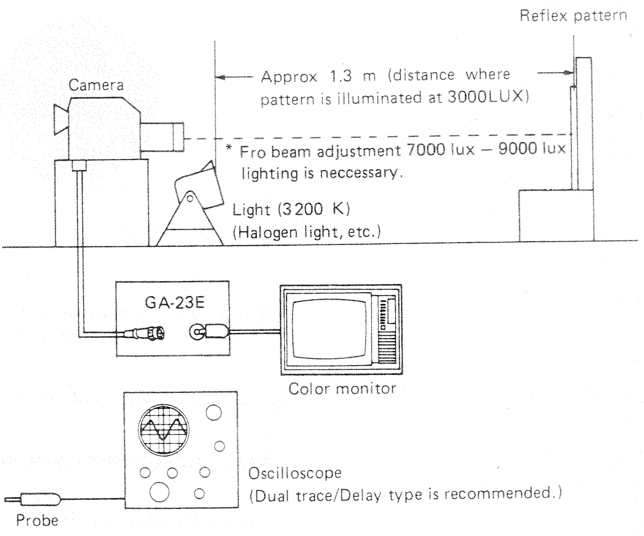

Reflex pattern
Camera
Approx 1.3 m (distance where pattern is illuminated at 3000LUX)
* Fro beam adjustment 7000 lux – 9000 lux lighting is neccessary.
Light (3200 K)
(Halogen light, etc.)
GA-23E
Color monitor
Oscilloscope
(Dual trace/Delay type is recommended.)
Probe

Fig. 3-2

3.2 PREPARATION AND CHECKS

3.2.1 Precaution

1. Use a 3200 K light fixture. Set the light source so that the pattern is illuminated uniformly at more than 3000 lux. For BEAM adjustment, 7000 lux – 9000 lux lighting is necessary.

   Note that correct adjustments cannot be performed with improper lighting.
2. Supply power to the camera and allow the camera to warm up for at least 10 minutes before proceeding with adjustments.
3. Trigger the oscilloscope from the following test points.
   - a) H rate: TP-3 (DEV/HV board)
   - b) V rate: TP-5 (VIDEO board)
4. **Before adjusting, check that the color temperature switch is set to INDOOR.**

> ***NOTE:*** *The standard adjustment procedures are described in the following. Due to such factors as differing characteristics among individual pickup tubes and deflection yokes, the numerical values given may vary somewhat during actual service. Therefore perform adjustments for the optimum points.*

3.3 VIDICON REPLACEMENT

3.3.1 Vidicon removal and replacement

1. Unsolder the ground wire of the shield case. Remove two screws ① from the shield case as shown in Fig. 3-3.

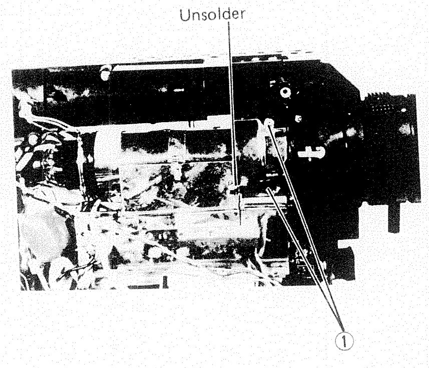


Fig. 3-3

2. Loosen the vidicon screw as shown in Fig. 3-4.

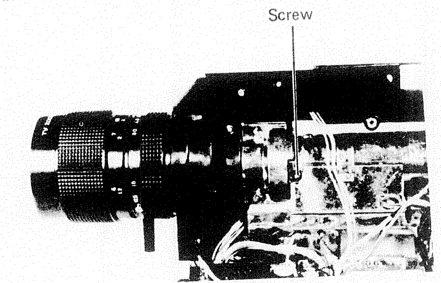


Fig. 3-4

3. Remove the vidicon cover with the shield case.

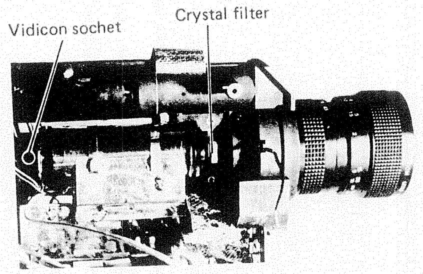


Fig. 3-5

4. Remove the vidicon socket. Pull out the deflection yoke with the pre amp case (including vidicon).

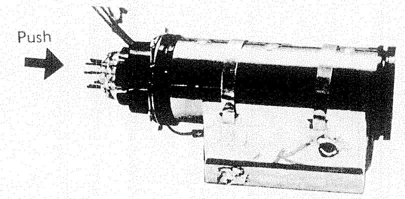


Fig. 3-6

5. Push the vidicon bottom gently and pull out the vidicon from the deflection yoke.
6. Refer to Fig. 3-6 and remove the vidicon.

   Insert a new vidicon (PUS46247B) to the deflection yoke.

> ***NOTE:*** *The black mask is essential for obtaining stable black level. Very carefully set it at the position if it is removed as shown in Fig. 3-7.*
>
> Attached mask should be parallel with the internal black mask of the vidicon.
>
> Upper edge of the mask is positioned 2.9 ± 1 mm from the center mask.

7. Vidicon and deflection yoke position is very important when installing a new vidicon as shown in Fig. 3-7.

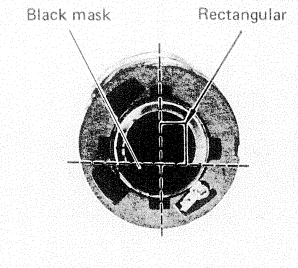


Fig. 3-7

8. After installing, be sure to perform electrical checks. Observe that the black mask does not appear in the picture. Pick up a bright subject (which covers the upper portion of the picture area) and check for absence of colour phase and level variations.

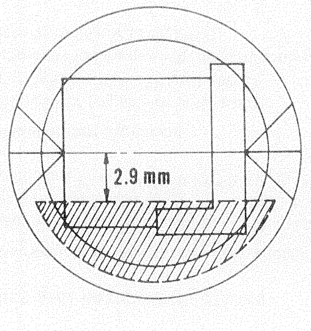


Fig. 3-8

9. Reassemble the camera (reverse the steps of Disassembly) to the point the vidicon cover is installed, then temporarily produce a picture.
10. After the tube replacement, please follow electrical adjustment procedure (subsection 3.4, 3.5).

3.4 DEFLECTION SYSTEM ADJUSTMENTS

NOTE: *The following adjustments are considered "standard". However, note that the values given may vary slightly according to the individual characteristics of the vidicon and camera deflection yoke.*

3.4.1 Shading zero setting

- Normal signal system adjustment

Shading zero setting is not necessary to readjust, but if shading potentiometer had been miss-adjusted or vidicon tube replaced, start from shading zero setting.

Connect oscilloscope to TP-4 and TP-5 of the DEF/HV board. So that shading correction is not applied, adjust R82, R38, R80, R36, R44, R42, R93 and R92 to remove the parabolic and sawtooth waveforms and obtain a straight line, as shown in Fig. 3-9.

3.4.2 Target (dark current) adjustment

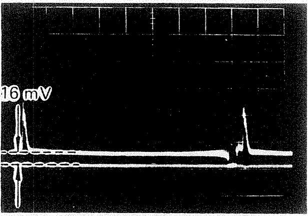
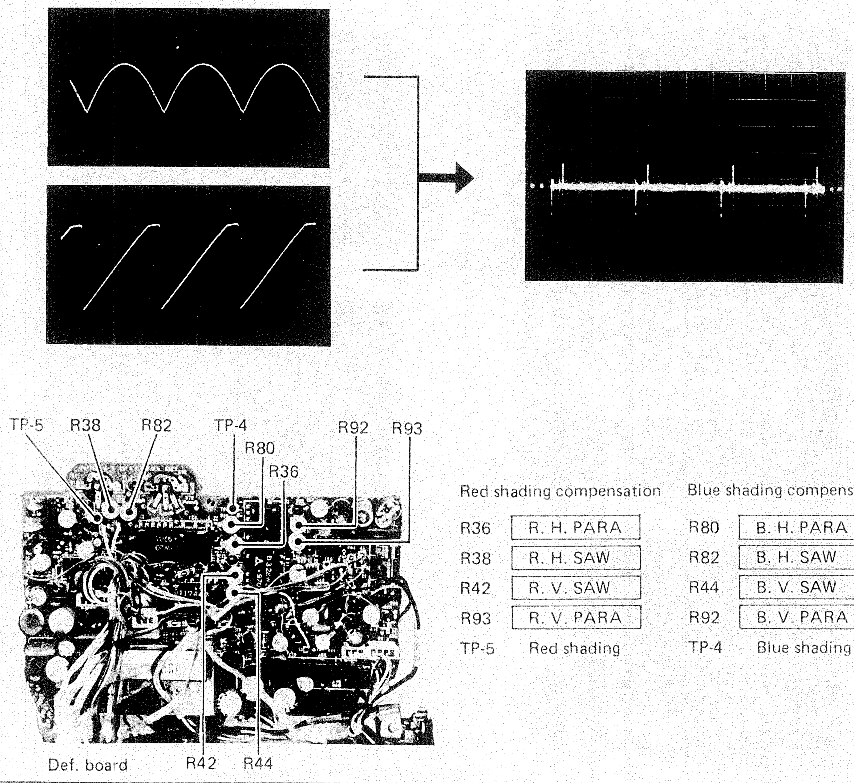


Fig. 3-10 Target adjustment

1. Connect oscilloscope to TP-1 of the VIDEO board. Cap the camera lens to cut off the light.
2. Adjust R30 TARGET BIAS of the DEF/HV board for 16 mV dark current.



Red shading compensation		Blue shading compensation	
R36	R. H. PARA	R80	B. H. PARA
R38	R. H. SAW	R82	B. H. SAW
R42	R. V. SAW	R44	B. V. SAW
R93	R. V. PARA	R92	B. V. PARA
TP-5	Red shading	TP-4	Blue shading

Fig. 3-9 Shading zero setting

3.4.3 Beam adjustment

With the same set-up as above, remove the lens cap and open the lens iris to fully opened condition. Turn "IRIS" control (R72) to "MANUAL" fully opened condition, then turn R74 IRIS SET of the H/DEF board fully counterclockwise.

1. Connect oscilloscope to TP-1 of the video board and take white pattern.
2. For this adjustment white pattern should be illuminated 7000 – 9000 lux.
3. Zoom back or change the chart position so that the white pattern covers only a small portion of the picture area.
4. Adjust R56 BEAM on H/DEF to obtain 0.8 Vp-p signal level with limited condition as shown in Fig. 3-11.

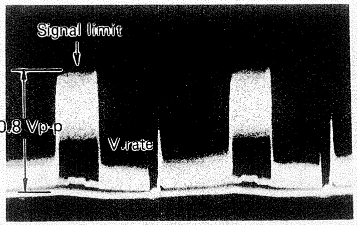


Fig. 3-11 Beam adjustment

3.4.4 Focus adjustment

1. Pick up a white pattern. Adjust so that the white image completely fills the picture area. Set the iris control to center (middle level of TP-6 waveform as shown in Fig. 3-12).
2. Connect oscilloscope to TP-6 of the VIDEO board.
3. Adjust R52 FOCUS of the DEF/HV board for maximum waveform at TP-6.

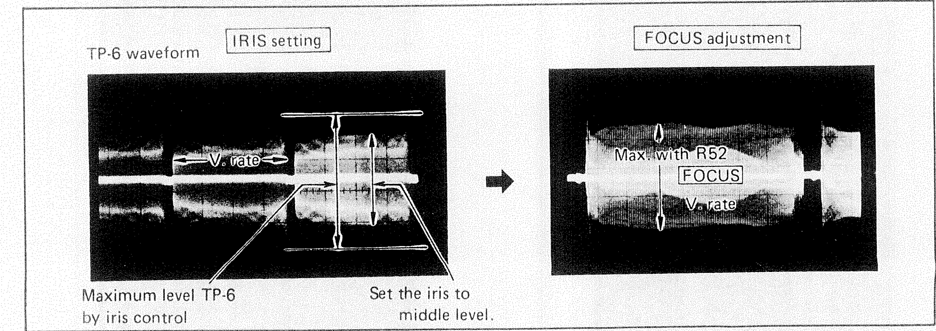


Fig. 3-12 FOCUS adjustment

3.4.5 Tube rotation adjustment

1. Pick up a white pattern. Adjust so that the white image completely fills the picture area. Set the iris to center as same as FOCUS adjustment, Section 3.4.4.
2. Connect oscilloscope to TP-6 of the VIDEO board and connect external sync to TP-5 of the video board. Then observe the 3.58 MHz color subcarrier in the center horizontal line with DELAY SWEEP mode of the oscilloscope.

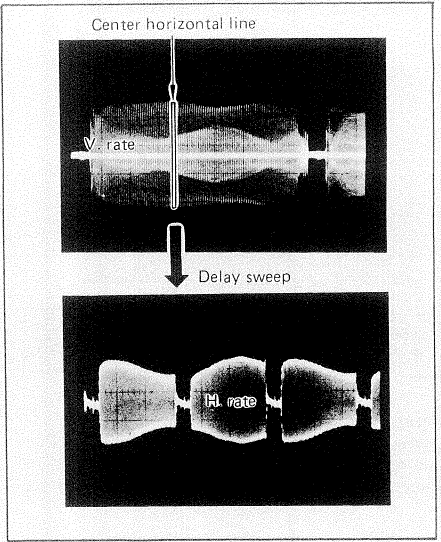


Fig. 3-13

3. Loosen the vidicon clamp screw as shown in Fig. 3-4.
4. Carefully rotate the vidicon socket together with the vidicon to obtain the flattest waveform at TP-6 as shown in Fig. 3-14.

> Caution:
>
> **High voltage circuits are located in this area.**

5. Gentry fasten the vidicon clamp screw.

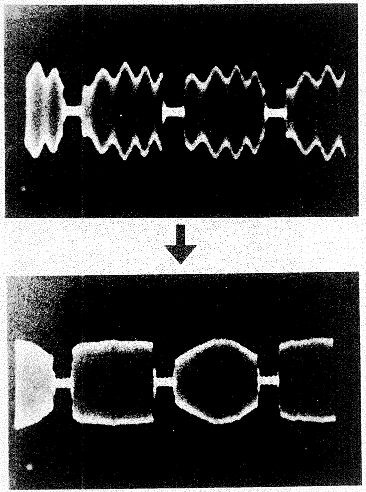
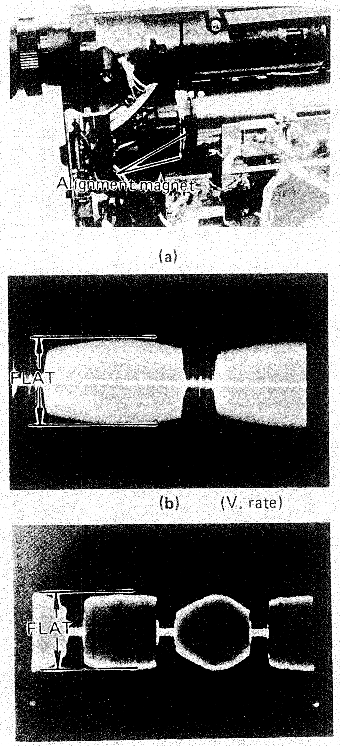


Fig. 3-14

3.4.6 Alignment

1. Pick up a red pattern (red poster paper) or a white pattern through a red filter (V-R61). Adjust the lens iris for 0.75 Vp-p at TP-3 of the video board.
2. Adjust for zero shading waveforms at TP-4 and TP-5 of the H/DEF board (see section 3.4.1).
3. Connect oscilloscope to TP-6 of the VIDEO board. Adjust the position of the alignment magnet to obtain the flattest waveform as shown in Fig. 3-15.
4. Observe the picture on a monitor and confirm absence of colour unevenness.
5. If unevenness cannot be eliminated, adjust shading compensation.
6. After adjusting for the optimum point, again check the rotation.
7. Pick up a white pattern and confirm absence of colour unevenness.



(a)

(b) (V. rate)

(c) (H. rate)

Fig. 3-15 Alignment

NOTE: *1) Confirm that the red color is even throughout the display on the monitor.*

3.4.7 V. height and Linearity

1. Adjust so that a white image completely fills the picture area and set the iris control to ccenter as same condition as FOCUS adjustment (section 3.4.4).
2. Connect oscilloscope to TP-6 of the VIDEO board.
3. Adjust R46 and R24 of the DEF/HV board to minimize waveform undulations.
4. Alternately repeat this adjustment and the H. width, Linearity adjustment (section 3.4.8) several times.

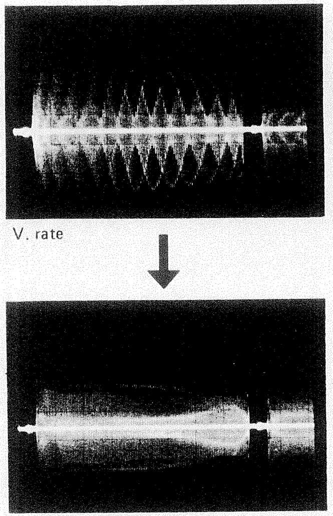


Fig. 3-16 V. height and Linearity

3.4.8 H. width and Linearity

1. Adjust so that a white image completely fills the picture area and set the iris control to center as same condition as FOCUS adjustment (section 3.4.4).
2. Connect oscilloscope probe to TP-6 of the VIDEO board through the jig shown in Fig. 3-17.
3. Adjust R6, R13 and R39 for maximum and flattest waveform as shown in Fig. 3-18.

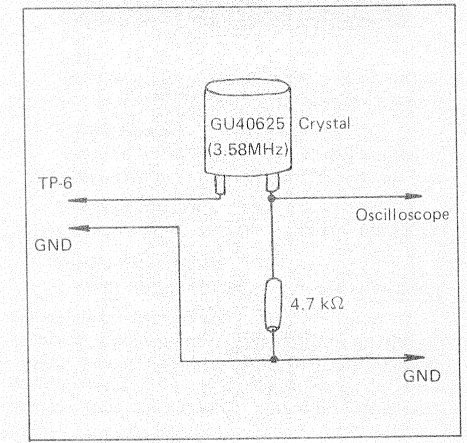


Fig. 3-17

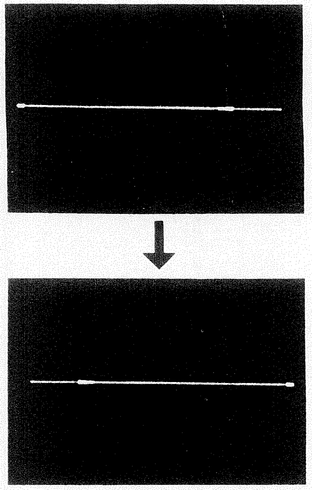


Fig. 3-18

4. If there is no 3.58 MHz X'tal oscillator, connect oscilloscope to 3.58 MHz external oscillator and TP-6 of the video board. Then set scope to "ADD" mode and adjust R6, R13 and R39 to flattest waveform as shown in Fig. 3-19.

> *Repeat the above steps, sections 3.4.7 and 3.4.8 several times to obtain the optimum adjustments.*

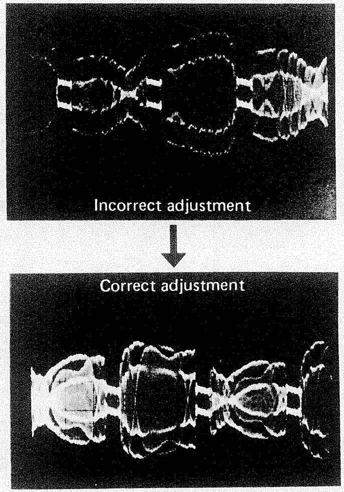


Fig. 3-19 H. width and Linearity adjustment

3.4.9 V. centering

1. Set the monitor for underscan. Measure the vertical height of the raster and draw a line indicating the midpoint directly on the monitor screen (use a felt pen or other afterwards erasable marker). See Fig. 3-20.
2. Adjust so that a white image completely fills the picture area and set the lens iris for an easily seen display.
3. Use a length of lead wire to connect TP-1 to TP-2 of the DEF/HV board.
4. Turn R9 of the DEF/HV board fully clockwise so that the center mark of the pickup tube becomes visible on the monitor.
5. Adjust R17 of the DEF/HV board to align the pickup tube center mark with the previously drawn center mark on the monitor.
6. Remove the jumper wire and proceed to the following section 3.4.10.

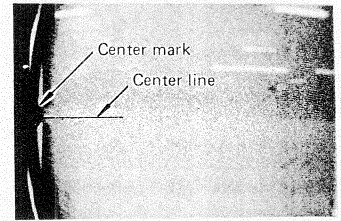


Fig. 3-20 V. centering

3.4.10 H. centering

1. At completion of the previous section, the pickup tube black mask appears at the right edge of the under scan monitor as shown in Fig. 3-21.
2. Adjust R9 of the DEF/HV board to align the black mask with the right edge of the picture (so that it is just beyond visibility).

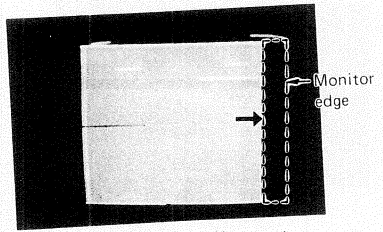


Fig. 3-21 H. centering

3.4.11 Optical back focus (flange-back) adjustment

1. Set the iris to fully opened position with appropriate ND filter, if necessary.
   Select a subject more than 30 meters away and set focus to infinity with 20 mm zooming position.
2. Loosen the back focus adjustment screw as shown in Fig. 3-22 and adjust best focus picture on TV monitor.
3. And then zoom to full close-up, check focus on TV monitor, if it is out of focus re-adjustment is necessary.
4. Tighten the back focus screw to secure back focus adjustment.
   After tightening screw, recheck the above steps.

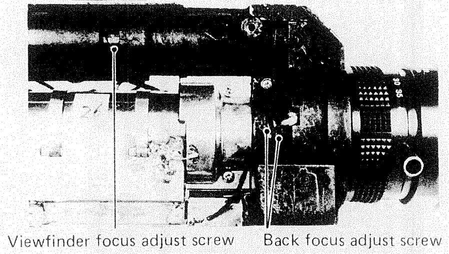


Fig. 3-22

3.4.12 Viewfinder focus adjustment

1. After back focus adjustment, check the viewfinder focus.
2. If viewfinder focus is incorrect, adjust viewfinder focus screw to best focus position as shown in Fig. 3-22.

3.5 SIGNAL SYSTEM ADJUSTMENTS

3.5.1 Pedestal set

1. Cap the lens and connect oscilloscope to TP-2 of the VIDEO board.
2. Disconnect pre-amp output connector (P1) as shown in Fig. 3-23.

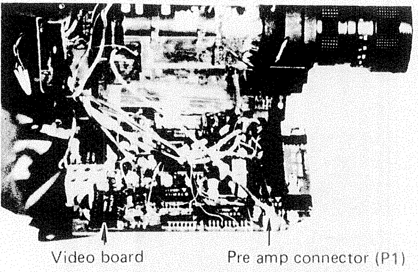


Fig. 3-23

3. Adjust R21 $\boxed{\text{P. SET}}$ of video board to center the waveform as shown in Fig. 3-24.

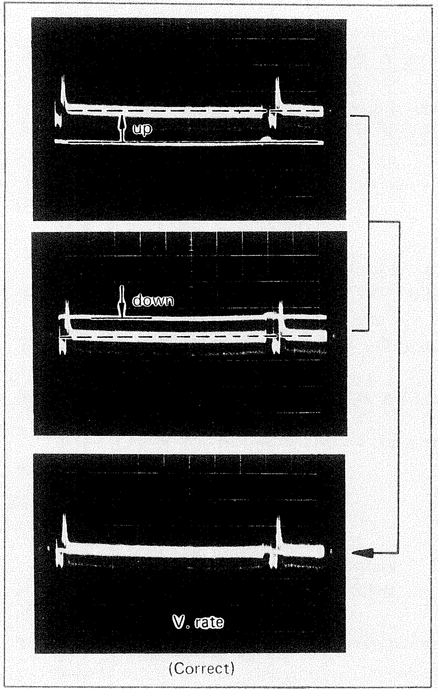


Fig. 3-24 Pedestal set

4. Reconnect the pre-amp connector.
5. Adjust R25 $\boxed{\text{DCC}}$ of the DEF/HV board to center position with "SENSITIVITY" SW up position as shown in Fig. 3-25.

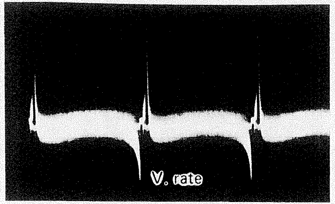


Fig. 3-25 DCC set

3.5.2 Y. low setup

1. Pick up the greyscale pattern (GS-2) and adjust the iris to obtain a level of 0.4 Vp-p at TP-2 on video board as shown in Fig. 3-26.
2. Adjust R23 $\boxed{\text{Y. LOWSETUP}}$ of video board to obtain 40 mVp-p at TP-9 as shown in Fig. 3-27.

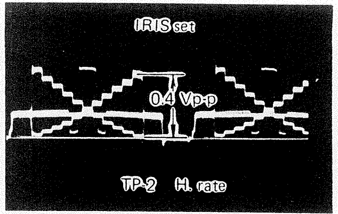


Fig. 3-26

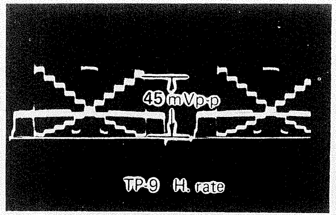


Fig. 3-27 Y. Low setup

3.5.3 Y. gamma adjustment

1. Set R15 $\boxed{\text{W. CLIP}}$ and R72 $\boxed{\text{C. GAIN}}$ on video board to minimum position (fully clockwise position).
2. Pick up greyscale and adjust the iris to obtain a level of 1.0 Vp-p at TP-2 on video board as shown in Fig. 3-28.

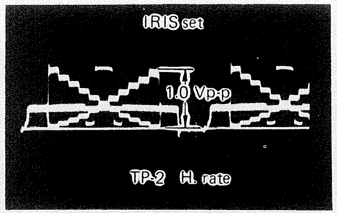


Fig. 3-28

3. Connect oscilloscope to pin 18 of IC6 and adjust R26 $\boxed{\text{Y-}\gamma\text{-SET}}$ on video board so that the waveform becomes as shown in Fig. 3-29.

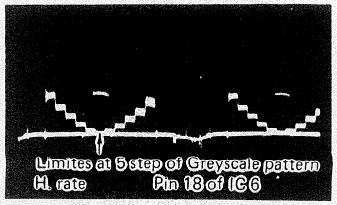


Fig. 3-29 Y. Gamma adjustment

3.5.4 Y. setup

1. Cap the lens and connect oscilloscope to TP-3 of video board.
2. Adjust R16 Y. SETUP of video board for a 50 mV setup level.

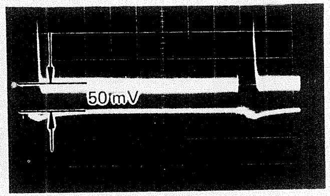


Fig. 3-30 Y. set-up

3.5.5 Y. gain

1. Pick up greyscale and adjust the lens iris to obtain a level of 1.0 Vp-p at TP-2.
2. Set R72 C GAIN to the VIDEO board to minimum carrier leakage (fully clockwise postion).
3. Connect oscilloscope to TP-3 and adjust R17 Y. GAIN of video board for a 0.65 Vp-p white level.

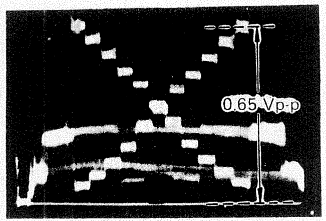


Fig. 3-31 Y. gain

3.5.6 De-gamma adjustment

1. Pick up greyscale and adjust the iris to obtain a level of 1.4 Vp-p at TP-2 as shown in Fig. 3-32.
2. Connect oscilloscope to pin 1 of IC6 and adjust R30 DE-GAMMA on video board to obtain the waveform as shown in Fig. 3-33.

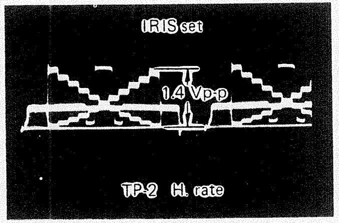


Fig. 3-32

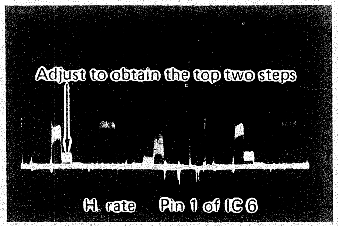


Fig. 3-33 De-gamma adjustment

3.5.7 Red color separation adjustment

1. Connect oscilloscope to TP-14 of VIDEO board with white pattern.
2. Set iris to center position and place a blure filter (V-42) in front of the lens.
3. Adjust R80 R. BAL. and C13 R. PHASE on video board to minimum leakage on TP-14 as shown in Fig. 3-34.

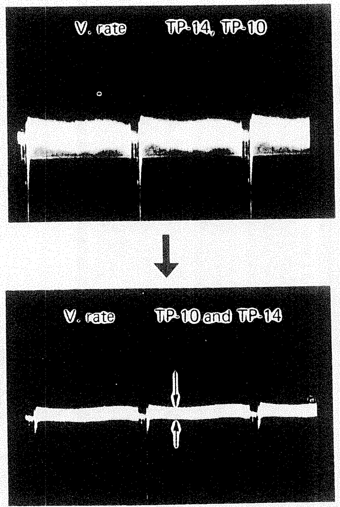


Fig. 3-34 Color separation adjustment

3.5.8 Blue color separation adjustment

1. Set iris to center position and place a red filter (V-R61) in front of the lens.
2. Connect oscilloscope to TP-10 and adjust R46 B. BAL and C12 B. PHASE on video board to minimum leakage.

3.5.9 Red and Blue setup adjustment

1. Connect oscilloscope to TP-14 of VIDEO board with iris close.
2. Adjust R91 R. SETUP on video board for zero setup as shown in Fig. 3-35.
3. Then connect oscilloscope to TP-10 with iris close.
4. Adjust R60 B. SETUP for zero setup.

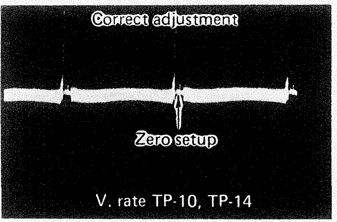


Fig. 3-35 R. B. set-up & gain adjustment

3.5.10 Red and Blue gain adjustment

1. Set the iris to 0.4 V on TP-2 with white chart.
2. Connect oscilloscope to TP-14 on VIDEO board.
3. Adjust R81 R. GAIN for center waveform as shown in Fig. 3-35.
4. Connect oscilloscope to TP-10 and adjust R47 B. GAIN for center waveform same as above.

3.5.11 SHADING COMPENSATION

Focus adjustment

1. Pickup a white chart and set the iris for 0.4 V at TP-2.
2. Connect oscilloscope to TP-14 of the VIDEO board.
3. To obtain a flat waveform as shown in Fig. 3-36, adjust R52 FOCUS of the DEF/HV board.
4. If a flat waveform cannot be obtained, adjust R88 V. PAR and R89 V. SAW of the D. Focus board.

Red shading compensation

1. Connect oscilloscope to TP-14 and set the auto iris switch to "AUTO" position.
2. Adjust R38 R. H. SAW and R36 R. H. PAR on DEF/HV board to flat waveform with H. rate as shown in Fig. 3-37.
3. Adjust R42 R. V. SAW and R93 R. V. PAR. on DEF/HV board for flat waveform with V. rate as shown in Fig. 3-38.

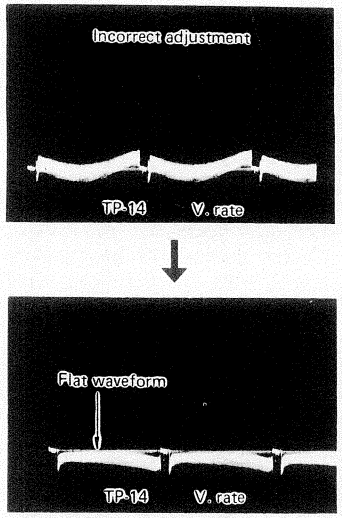


Fig. 3-36 Shading adjustment

Blue shading compensation

1. Connect oscilloscope to TP-10 on VIDEO board with same condition as above.
2. Adjust R80 B. H. PAR., R82 B. H. SAW, R44 B.V. SAW and R92 B. V. PAR. for flat waveform as same manner as above.

Horizontal Red & Blue shading compensation

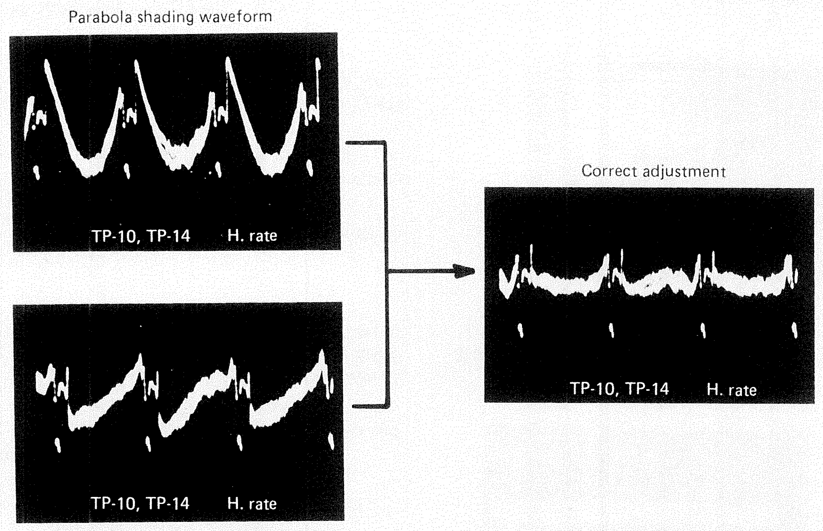


Fig. 3-37 Horizontal shading correction

Vertical Red & Blue shading compensation

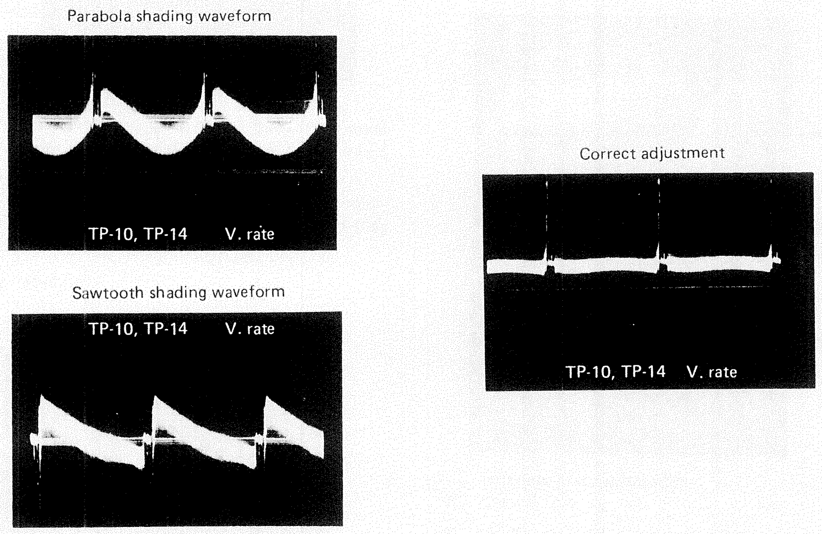


Fig. 3-38 Vertical shading compensation

3.5.12 WHITE BALANCE ADJUSTMENT

1. Y. low setup check
   Verify section 3.5.2.
2. Red, Blue setup and Gain adjustment
   1) Connect oscilloscope to TP-3 and then set the iris to 0.4 V with greyscale pattern, then connect oscilloscope to TP-3 on the video board.
   2) Turn off gamma set potentiometer R55 B.γ-SET, R86 R.γ-SET (counter clockwise), R58 B.γ-GAIN, R89 R.γ-GAIN (clockwise on video board).
   3) Adjust R72 C. GAIN to 0.3 Vp-p burst level.
   4) Connect TP-14 to ground and adjust R60 B. SET UP to just before minimum carrier leakage on black level (First step of greyscale) on TP-3 of the video board as shown in Fig. 3-39.
   5) Adjust R47 B. GAIN to minimum carrier leakage on video signal as shown in Fig. 3-40.

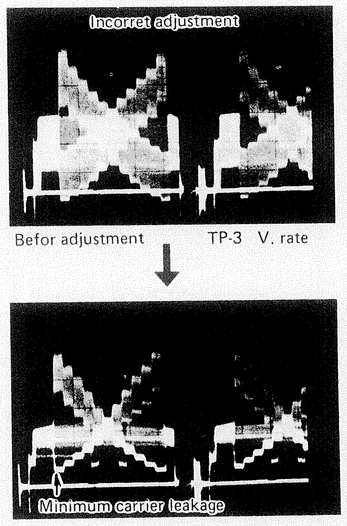


Fig. 3-39 White balance adjustment

   6) Remove connector from TP-14 and then connect TP-10 to ground.
   7) Adjust R91 R. SETUP and R81 R. GAIN as same manner as above.
2. Red and Blue gamma set
   1) With same condition as above, adjust iris to 0.8 Vp-p video signal on TP-3 of the video board.
   2) Adjust R55 B. γ-SET, R58 B. γ-GAIN and then R86 R. γ-SET, R89 R. γ-GAIN with same manner as step 4), 5), 6) and 7) of the above as shown in Fig. 3-40.

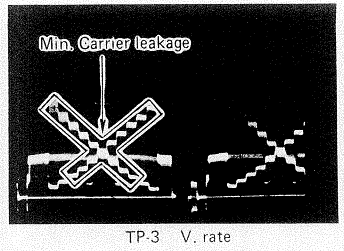


Fig. 3-40 White balance adjustment

3.5.13 White clip

1. In the same condition as above, fully open the lens iris.
   Adjust R73 of video board to minimum carrier leakage (clockwise) on TP-3 of teh video board.
2. Adjust R15 W. CLIP on video board so that clipping point becomes 0.84 Vp-p as shown in Fig. 3-41.

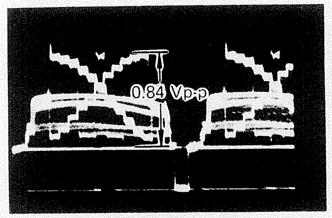


Fig. 3-41

3.5.14 Chroma level adjustment

1. Connect oscilloscope to TP-3 on video board.
2. Adjust R73 of the video board for 0.3 Vp-p burst level.

Please DO NOT adjust following potentiometer.

R70	ENC BAL.
R113	R-Y BURST
R58	B-Y BURST

3.5.15 Chroma limiter

1. Pick up the greyscale and adjust the lens iris for more than 0.8 Vp-p of video signal at TP-3 (above the clipping level).
2. Observe the display on a color monitor and adjust R32 C. LIMIT on VIDEO board so that carrier leakage in the white portions that exceed the clipping level becomes minimized.

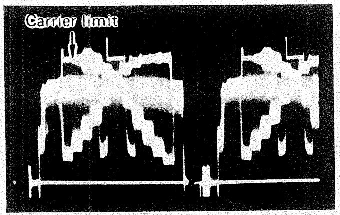


Fig. 3-42

3.5.16 Auto iris

1. Set the auto iris switch to "AUTO" position.
2. Pick up the greyscale pattern and adjust so that the image completely fills the picture area. Illuminate the greyscale at more than 3,000 lux.
3. Connect oscilloscope to TP-3 of the VIDEO board and adjust R74 of the DEF/HV board for a white peak of 0.7 V.

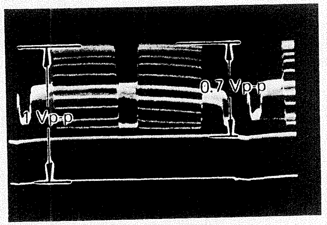


Fig. 3-43

3.5.17 Alarm set

1. Use a variable power supply as power source and measure the power supply voltage with a voltmeter.
2. Gradually reduce the power supply voltage. Adjust R64 of the DEF/HV board so that the alarm flickers when the power supply voltage declines to 10.9 V.

3.5.18 Irid LED

1. Pick up the greyscale. Set the auto iris switch to on.
2. Adjust R95 to just beyond the point where both red and green indicators in the viewfinder extinguish.
3. Set the iris for manual. Open the iris manually and confirm indicator lighting in the sequence red → extinguish → green.

3.5.19 Color compensator gain

1. Connect oscilloscope to IC3 pin 1 of the COLOR COMP. board.

2. Pick up the greyscale.
3. Adjust R6 for minimum error signal.
4. Operate the iris and confirm absence of large variations in the waveform.

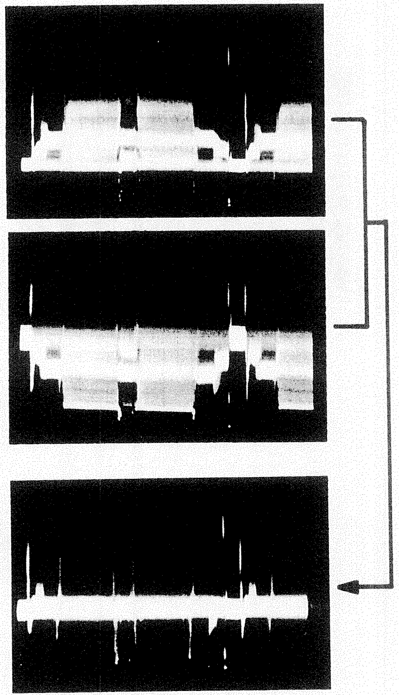


Fig. 3-44

3.5.20 Color balance

1. Pick up the greyscale pattern and observe the display on a color monitor.

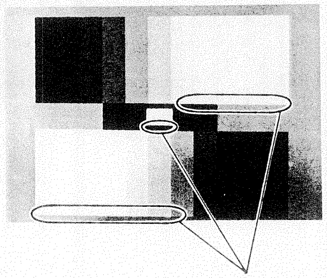


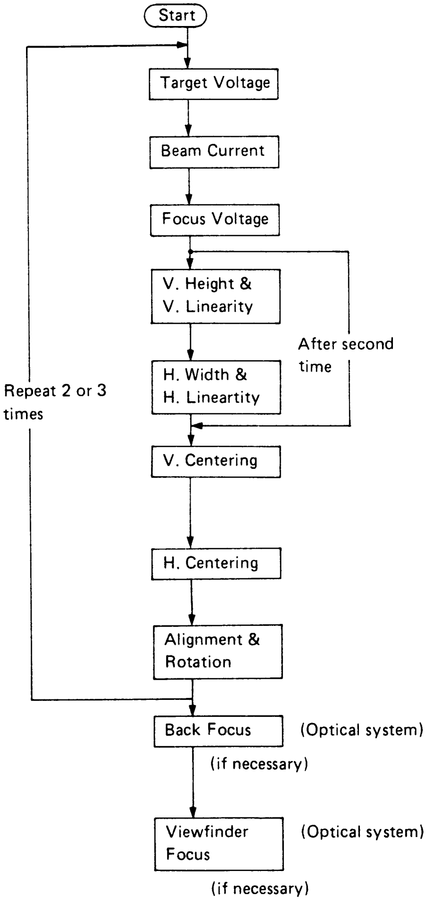
Fig. 3-45

2. Adjust R8 for absence of coloration (magenta or green) in the portions of the pattern indicated in Fig. 3-45.
3. Operate the lens iris and confirm absence of coloration.

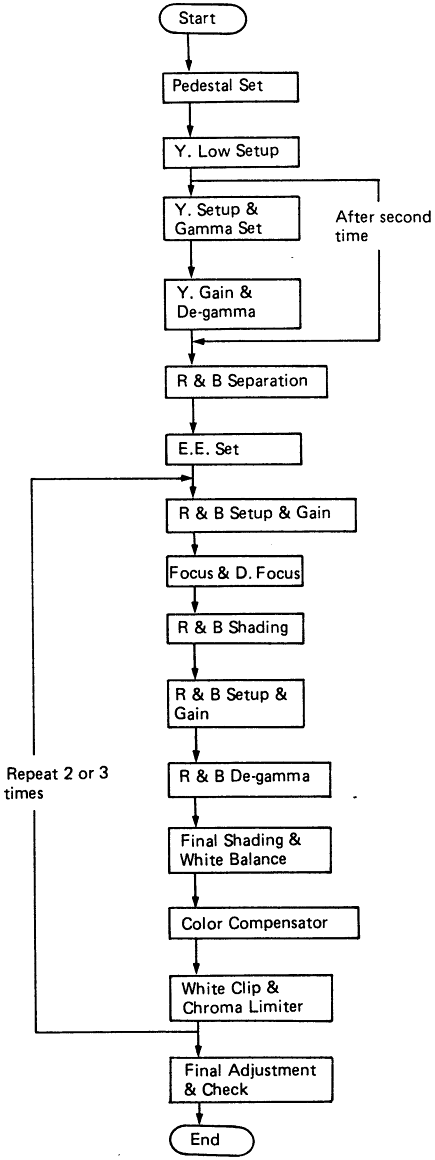
COLOR CAMERA ADJUSTMENT CHECKING LIST

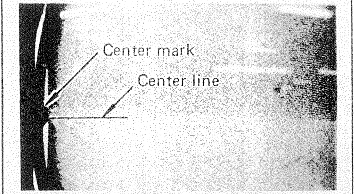
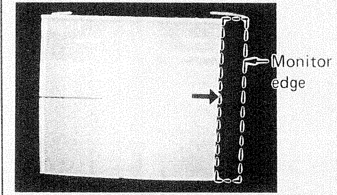
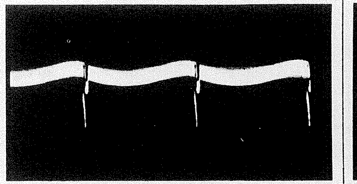
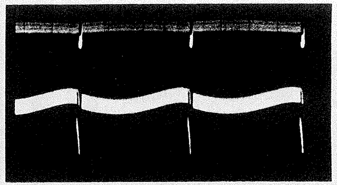
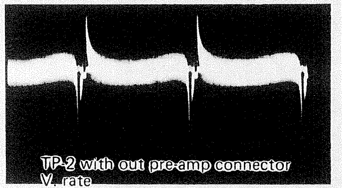
Adjustment flowcharts

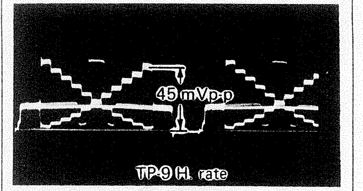
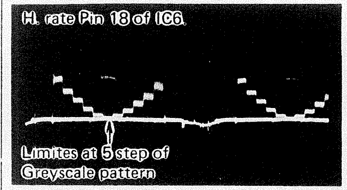
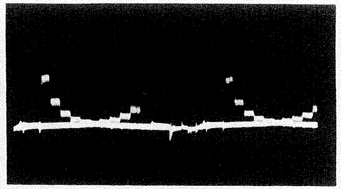
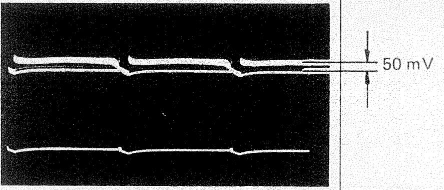
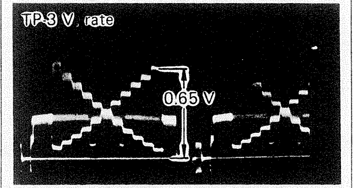
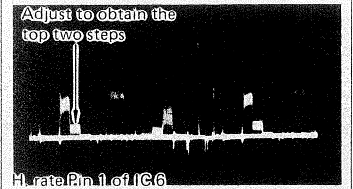
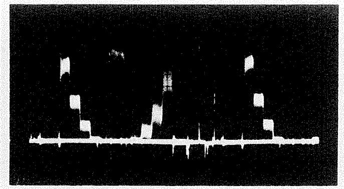
A. DEFLECTION SYSTEM

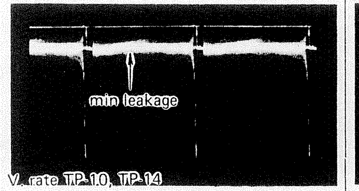
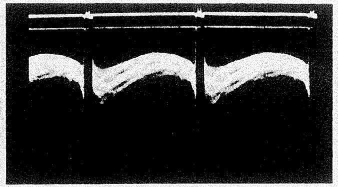
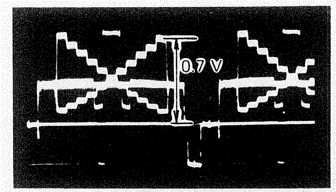
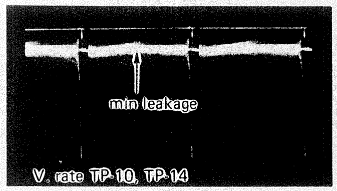
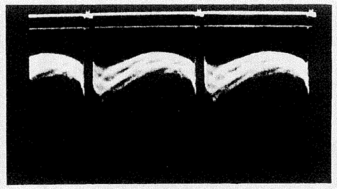
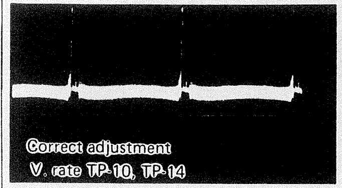
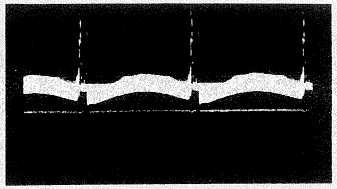

Start
Target Voltage
Beam Current
Focus Voltage
V. Height &
V. Linearity
After second
time
H. Width &
H. Lineartity
Repeat 2 or 3
times
V. Centering
H. Centering
Alignment &
Rotation
Back Focus
(Optical system)
(if necessary)
Viewfinder
Focus
(Optical system)
(if necessary)

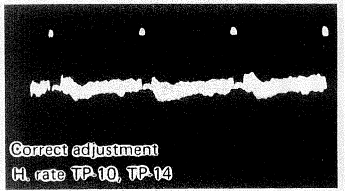
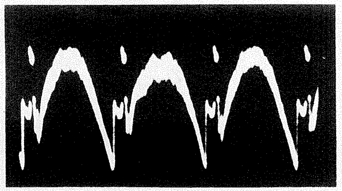
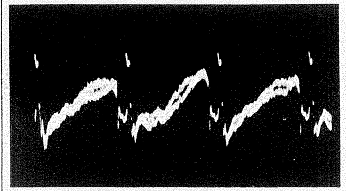
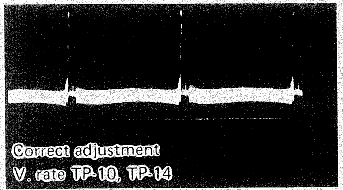
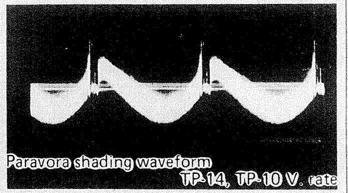
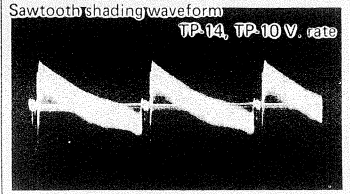
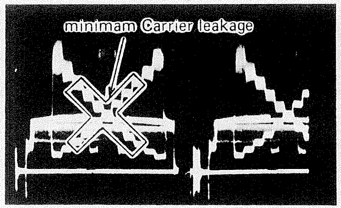
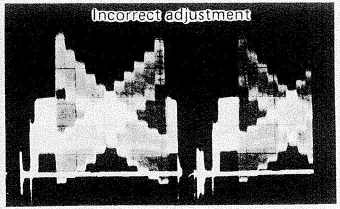
B. SIGNAL SYSTEM

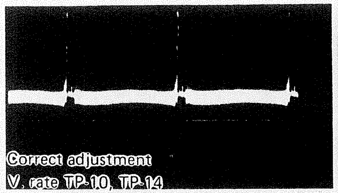
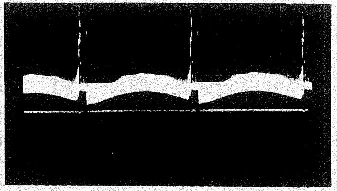
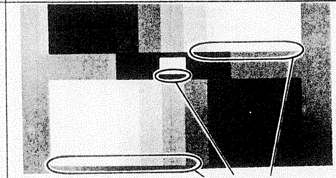
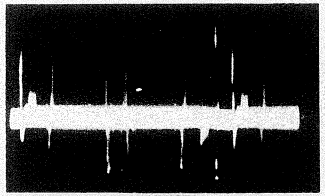
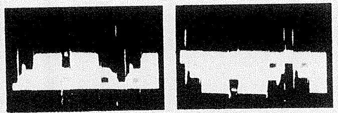
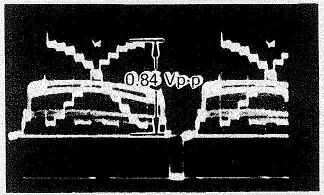
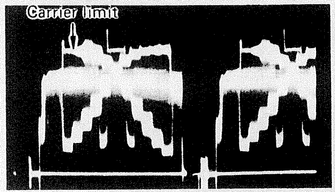
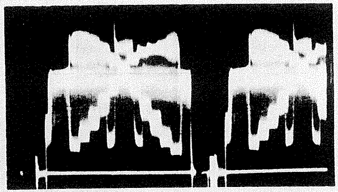

Start
Pedestal Set
Y. Low Setup
Y. Setup &
Gamma Set
After second
time
Y. Gain &
De-gamma
R & B Separation
E.E. Set
R & B Setup & Gain
Focus & D. Focus
R & B Shading
R & B Setup &
Gain
Repeat 2 or 3
times
R & B De-gamma
Final Shading &
White Balance
Color Compensator
White Clip &
Chroma Limiter
Final Adjustment
& Check
End

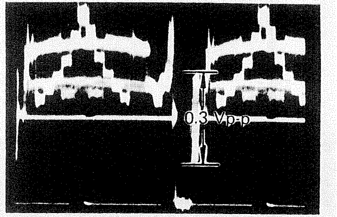
Name of Adjustment	Check point/ Board	No. of VR/ Board	Iris	Pattern	Oscilloscope range			Adjustment	Condition	Waveform	
					Volts	Time	Ext. sync			Correct adj.	Incorrect adj.
Vertical centering adjustment 3.4.9	Short circuit between TP-1 and TP-2 of Def. board	Tune R9 on Def. board to fully clockwise. R17/Def.	Center	White pattern	—	—	—	Adjust R17 so that center marker of vidicon tube to center of under scanning monitor TV.	—		—
Horizontal centering adjustment 3.4.10	—	R9/Def.	Center	White pattern	—	—	—	Adjust R9 so that optical black mask on the vidicon tube is just positioned right side of underscanning monitor.			—
Optical focus adjustment 3.4.11	—							Refer to 3.4.11	—	—	—
Viewfinder focus adjustment 3.4.12	—							Refer to 3.4.12	—	—	—
Target and Beam check								Refer to 3.4.2 and 3.4.3.	—	—	—
Pedestal set 3.5.1	TP-2/Video	R21/Video R25/Def.	Close Cap the lens cover.	—	10 mV	5 msec V. rate	TP-5/ Video	Disconnect P2 connector, adjust R21 to zero pedestal line. Then connect P2, adjust R25 to zero dark current with "SENSITIVITY" SW "UP" position.			
											—

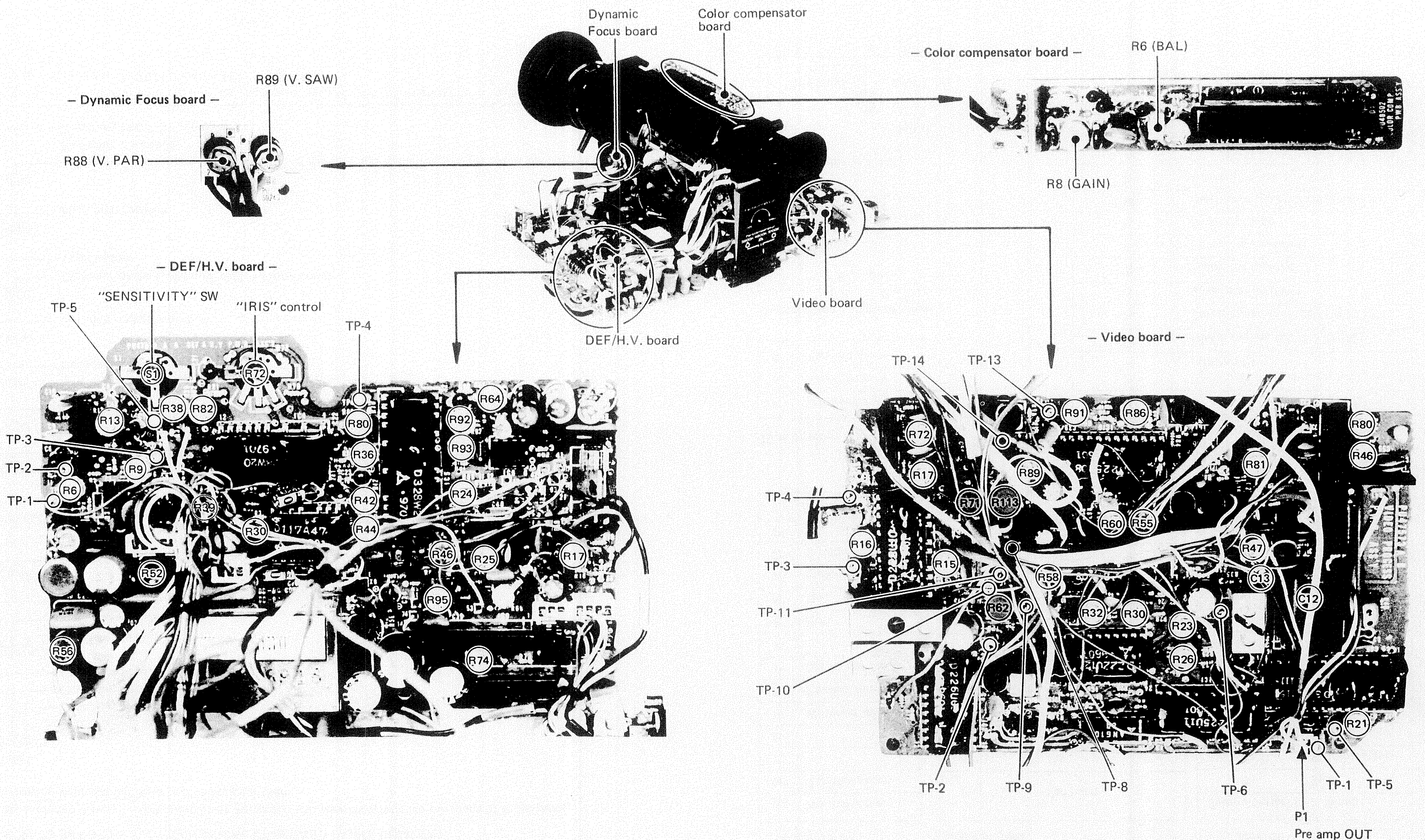
Name of Adjustment	Check point/ Board	No. of VR/ Board	Iris	Pattern	Oscilloscope range			Adjustment	Condition	Waveform	
					Volts	Time	Ext. sync			Correct adj.	Incorrect adj.
Y Low setup 3.5.2	TP-9/Video	R23/Video	0.4 Vp-p at TP-2	Grey-scale GS-2	10 mV	10 μsec	TP-3/ Def.	Adjust R23 to obtain 45 mVp-p on TP-9.	———		———
Y Gamma adjustment 3.5.3	Pin 18 of IC6/Video	R26/Video	1.0 Vp-p at TP-2	Grey-scale GS-2	5 mV	10 μsec	TP-3/Def.	Adjust R26 so waveform limits lower than 5 steps.	* R72 to fully clockwise position. * R15 to OFF position. * Colór compensator adjustment, color balance adjustment must be corrected.		
Y setup adjustment 3.5.4	TP-3/Video	R16/Video	Close	–	5 mV	5 msec	TP-5/ Video	Adjust R16 to 50 mV setup.	———		
Y Gain adjustment 3.5.5	TP-3/Video	R17/Video	1.0 Vp-p at TP-2	Grey-scale GS-2	20 mV	10 μsec	TP-3/Def.	Adjust R17 to 0.65 V video level.	———		
De-gamma adjustment 3.5.6	Pin 1 of IC6/ Video	R30/Video	1.4 Vp-p at TP-2	Grey-scale GS-2	5 mV	10 μsec	TP-3/Def.	Adjust R30 so waveform limits lower than 2 steps.	———		

Name of Adjustment	Check point/ Board	No. of VR/ Board	Iris	Pattern	Oscilloscope range			Adjustment	Condition	Waveform	
					Volts	Time	Ext. sync			Correct adj.	Incorrect adj.
Red color separation adjustment 3.5.7	TP-14/Video	R80, C13/Video	Center	White pattern	20 mV	5 msec	TP-5/ Video	Adjust R80 and C13 for minimum carrier leakage.	Color temperature sw"INDOOR" mode with V-42 filter.		
Blue color separation adjustment 3.5.8	TP-10/Video	R46, C12/Video	Center	White pattern	50 mV	5 msec	TP-5/ Video	Adjust R46 and C12 for minimum carrier leakage.	Color timperature sw "INDOOR" mode with V-R61 filter.		
E-E set 3.5.16	TP-3/Video	R74/Def.	"AUTO" position	Greyscale	20 mV	10 μsec	TP-5/ Video	Adjust R74 to 0.7 V video signal for precise scanning on underscan monitor.	Greyscale filling picture area.		
Red setup 3.5.9	TP-14/Video	R91/Video	Close	—	5 mV	5 msec	TP-5/ Video	Adjust R91 for zero setup.	———		
Red gain 3.5.10	TP-14/Video	R81/Video	0.4 V on TP-2	White pattern	10 mV	5 msec	TP-5/ Video	Adjust R81 to center the waveform.	———		
Blue setup 3.5.9	TP-10/Video	R60/Video	Close	—	5 mV	5 msec	TP-5/ Video	Adjust same as above.	———		
Blue gain 3.5.10	TP-10/Video	R47/Video	0.4 V on TP-2	White pattern	5 mV	5 msec	TP-5/ Video		———		
Focus adjustment 3.5.11	TP-14/Video	R52/Def. R88/D. Fous R89/D. Fous	0.4 V on TP-2	White pattern	10 mV	5 msec	TP-5/ Video	Adjust R52, R88 and R89 for flat vaveform at TP-14. *For this adjustment shading compensation is zero setting. (R38, 36, 42, 93, 82, 80, 44, 92)	———		

Name of Adjustment	Check point/Board	No. of VR/Board	Iris	Pattern	Oscilloscope range			Adjustment	Condition	Waveform	
					Volts	Time	Ext. sync			Correct adj.	Incorrect adj.
Red shading compensation 3.5.11	TP-14/Video	R36, R38, R42, R93/Def.	"AOUT" position	White pattern	5 mV 5 mV	10 µsec (H. rate) 5 msec (V. rate)	TP-5/Video	Adjust R38 and R36 for flat waveform with H. rate. Adjust R42 and R93 for flat waveform with V rate.	White pattern is illuminated uniformly.		 
Blue shading adjustment 3.5.11	TP-10/Video	R82, R80, R44, R92/Def.	"AOUT" position	White pattern	20 mV	10 µsec (H. rate) 5 msec (V. rate)	TP-5/Video	Adjust R82 and R80 for flat waveform with H. rate. Adjust R44 and R92 for flat waveform with V. rate.	Same as above		 
Y Low setup check 3.5.2	–	–	–	–	–	–	–	Refer to section 3.5.2.	———	———	———
Red and Blue setup and Gain adjustment 3.5.12	TP-3/Video	R60, R47, R91, R81	0.4 V on TP-3	Grey-scale GS-2	10 mV	10 µsec (H. rate) 5 msec (V. rate)	TP-3/Def.	Connect TP-13 of video to GND. Adjust R60 to minimum carrier leakage. Adjust R47 to minimum carrier leakage. Connect TP-14 to ground. Adjust R91 and R81 as same as above.	*Red, Blue gamma. Set R55 and R86, R58 and R89 OFF. R55, R86 Counterclockwise R58, R89 Clockwise		 Befor adjustment TP-3 V. rate
Red and Blue gamma set and gain adjustment 3.5.12	TP-3/Video	R55, R86, R58, R89	0.8 V on TP-3	Grey-scale GS-2	20 mV	10 µsec (H. rate) 5 msec (V. rate)	TP-5/Video	Adjust as same as above.			

Name of Adjustment	Check point/ Board	No. of VR/ Board	Iris	Pattern	Oscilloscope range				Condition	Waveform	
					Volts	Time	Ext. sync			Correct adj.	Incorrect adj.
Final shading adjustment 3.5.11	TP-14/Video TP-10/Video	R36, R38, R42, R93/ Def. R80, R82, R44, R92	0.7 V on TP-2 "	White pattern "	20 mV "	10 µsec (H. rate) 5 msec (V. rate) "	TP-5/ Video	Adjust R36 and R38 for flat waveform with H. rate. Adjust R42 and R93 for flat waveform with V. rate. Adjust R80 and R82 for flat waveform with H. rate. Adjust R44 and R92 for flat waveform with V. rate.	———	 Correct adjustment V. rate TP-10, TP-14	
Color compensator adjustment 3.5.20 3.5.19		R8/Color comp.	Best iris "AUTO"	Grey-scale GS-2	—	—	—	Adjust R8 for best picture on monitor.	———	 Adjust for no color	
	PIN 1 of IC3/Color comp	R6/Color comp.	0.75 V on TP-3	Grey-scale	20 mV	5 msec V. rate	TP-5/ Video	Adjust R6 for minimum carrier leakage.	———		
White clip adjustment 3.5.13	TP-3/Video	R15/Video	Open	Grey-scale	20 mV	10 µsec	TP-3/ (Def.)	Adjust R15 to 0.84 Vp-p.	Fully open iris Manual open + R74 to open cond. more than 3000 lux lighting	 0.84 Vp-p	
Chroma limiter adjustment 3.5.15	TP-3/Video	R32/Video	0.8 V on TP-3	Grey-scale	20 mV	10 µsec	TP-3/ (Def.)	Adjust R32 for no carrier leakage on peak white.	"INDOOR"	 Carrier limit	

Nome of Asjustment	Check point/ Board	No. of VR/ Board	Iris	Pattern	Oscilloscope range			Adjustment	Condition	Waveform	
					Volts	Time	Ext. sync			Correct adj.	Incorrect adju.
Chroma level adjustment **3.5.14**	TP-3/Video	R72 Video	"AUTO" position	Greyscale	20 mV	10 μsec	TP-5/ Video	Adjust R72 to 0.3 Vp-p burst level.	"INDOOR"		
Battery alarm set **3.5.17**	Alarm LED	R64/Def.	–	–	–	–	–	Adjust R64 to start flashing with 10.9 V DC power supply.	External DC power supply is neccessary		
Iris indicator **3.5.18**	Irise indicator LED	R95/Def.			–	–	–	Adjust R95 for tune off. The iris indicator LED with "AUTO" position.	*Turn R75 fully clockwise, then adjust.		


Dynamic Focus board
Color compensator board
– Color compensator board –
R6 (BAL)
R8 (GAIN)
– Dynamic Focus board –
R89 (V. SAW)
R88 (V. PAR)
Video board
DEF/H.V. board
– DEF/H.V. board –
"SENSITIVITY" SW
"IRIS" control
TP-5
TP-4
TP-3
TP-2
TP-1
S1
R72
R13
R38
R82
R80
R64
R92
R93
R36
R9
R6
R39
R42
R24
R30
R44
R46
R25
R17
R52
R95
R56
R74
– Video board –
TP-14
TP-13
R91
R86
R72
R80
R46
R17
R89
R81
TP-4
R71
R113
R60
R55
R16
R47
TP-3
R15
R58
R13
TP-11
R62
R32
R30
R23
C12
R26
TP-10
R21
TP-2
TP-9
TP-8
TP-6
TP-1
TP-5
P1
Pre amp OUT
Connector

R17	V. Center	R80	Blue H. Parabola	R9	H. Center
R25	Dark Current Comp (DCC)	R36	Red H. Parabola	R6	H. Width
R24	V. Linearity	R42	Red V. Saw	R52	Focus
R46	V. Height	R44	Blue V. Saw	R56	Beam
R95	LED Set	R72	"IRIS" Control	R30	Target
R64	Battery Alarm Set	R82	Blue H. Saw	R74	Iris set
R92	Blue V. Parabola	R38	Red H. Saw		
R93	Red V. Parabola	R13	H. Linearity		
		R39	H. Linearity 2		

R15	White clip	R89	Red γ Gain	R23	Y Low Setup
R16	Y Set-up	R32	Chroma Limiter	R47	Blue Gain
R17	Y Gain	R30	De-γ	R81	Red Gain
R72	C Gain	R60	Blue Set-up	C13	Red Phase
R71	**ENCODER Balance**	R55	Blue γ Set	C12	Blue Phase
R113	**R-Y Burst**	R91	Red Set-up	R46	Blue Balance
R62	**B-Y Burst**	R86	Red γ Set	R80	Red Balance
R58	Blue γ Gain	R26	Y γ Set	R21	Pedestal Set

▨ : Please do not adjust

SECTION 4
EXPLODED VIEWS AND PARTS LIST

IMPORTANT SAFETY NOTICE

Parts identified by the ⚠ symbol are critical for safety. Replace only with parts number specified.

4.1 HOW TO READ THE JVC MECHANICAL STANDARD PARTS NUMBERS

In these exploded views the part numbers of the screws and washers symbolize the shape of those items.
The following examples will help you to decipher them.

Examples:

SPSP3006ZS
"ISO" metric screw thread
Length in mm (6 mm)
Diameter in mm (3 mm)
Cross-recrossed, pan head screw

LPSP3014ZS
Length: 14 mm
Diameter: 3 mm
Cross-recrossed, pan head screw with lock washer

DPSP4008ZS
Diameter: 4 mm
Cross-recrossed, pan head screw with lock washer and plain washer

SSSP3008ZS
Cross-recrossed, flat countersunk head screw

SDBP3006NS
Cross-recossed, binding head screw

YRS3004FS
Hexagon socket set screw with sunken tip

YFS3006FS
Hexagon socket screw with flat tip

BYS3006FS
Hexagon socket head bolt

WLS3000
Diameter of the screw applicable (3 mm screw)
Lock washer

WNS3000Z
Plain metal washer

REE4000
Diameter of the slot be around the face of the stud applicable (usually the stud's diameter if 5 mm and slot's one is 4 mm).
Retaining ring ("E" type)

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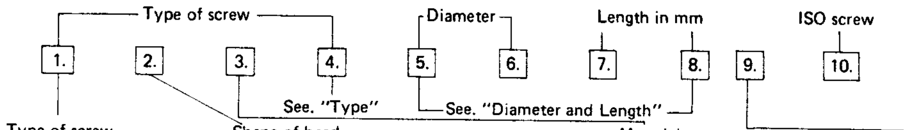
* For those not yet familiar with the international metric system. (the U.S. is presently in the process of conversion) one inch = approximately 25 millimeters (1 in. = 25.4 mm)

4.1.1 SCREW/WASHER/E-RING



Type of screw

S	Normal screw
N	Assembly screw
L	"
D	"
M	W. Wood screw
F	Feather screw
T	Set screw
Y	"
B	Bolt
N	Nut
W	Washer
R	E-ring
E	–
P	Spring

Shape of head

P		Pan head
S		Flat countersunk head
H		Oval countersunk head
D		Binding head
R		Round head
B		Round head
T		Truss head

Material

Symbol letter	Material
S	Steel
E	Stainless steel
C	Cast iron
U	Bronze
B	Brass
P	Phosphor bronze
N	German silver
Y	Brass
A	Aluminum
Z	Zinc-alloy

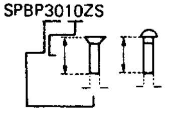
Type of screw

P	Cross-Recessed head screw
A	Tapping screw
B	Tapping screw

Diameter and Length of screw

– Example –

SPBP3010ZS



(Diameter x 10)

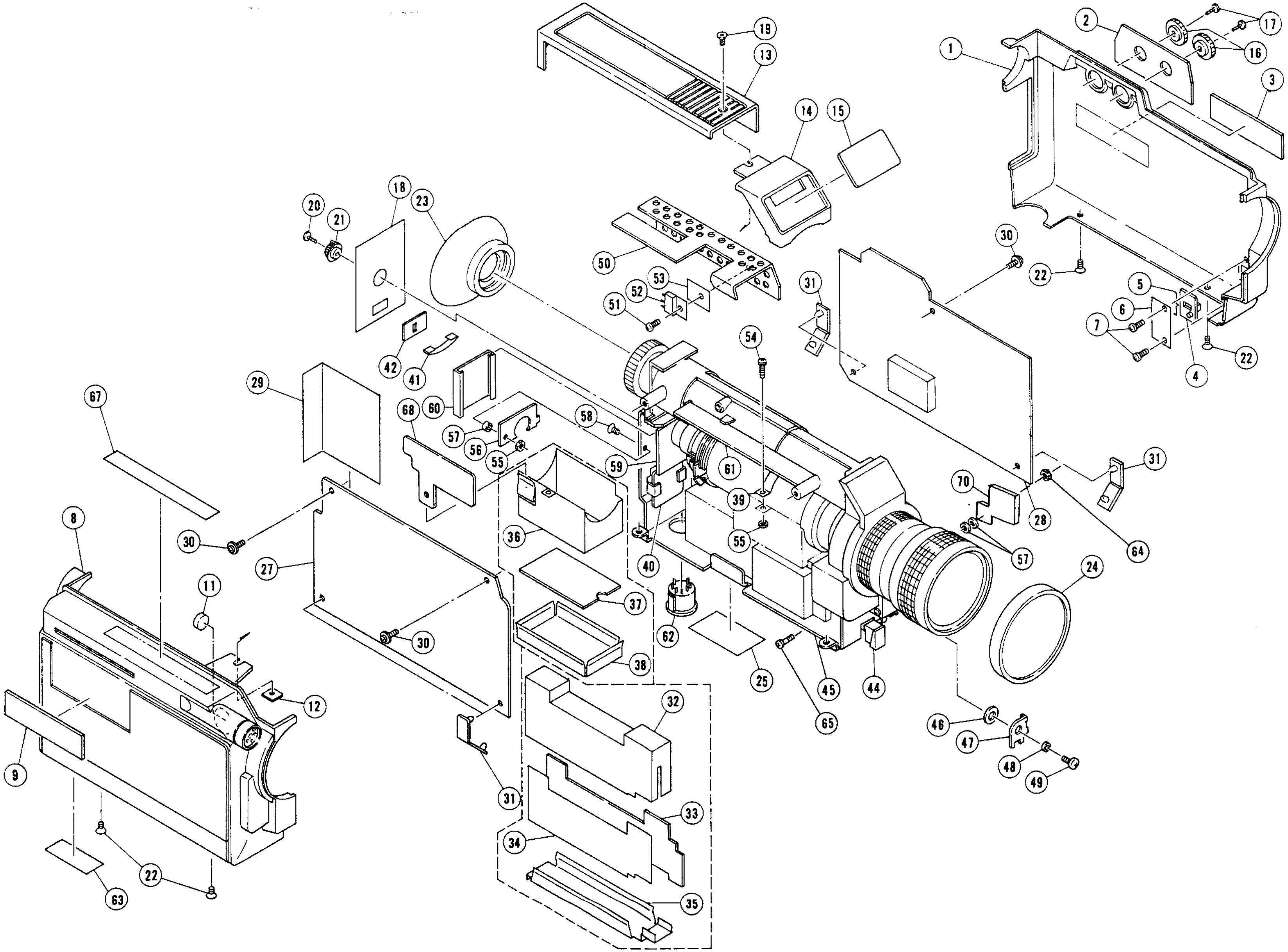
E-ring Washer

REE3000 WNS300N

Surface treatment

Symbol letter	Surface treatment
Z	Galvanization, dichromic acid treatment (MFZn2-C)
N	Nickel plating (MFNi2, MFNil)
R	Chrome plating (MBCr2, MBCr1)
G	Silver plating (SP4)
W	Nichrome platings
P	Phosphite treatment
B	Bronze plating
M	Black coloring after galvanization
F	Iron with black coloring

4.2 CABINET ASSEMBLY



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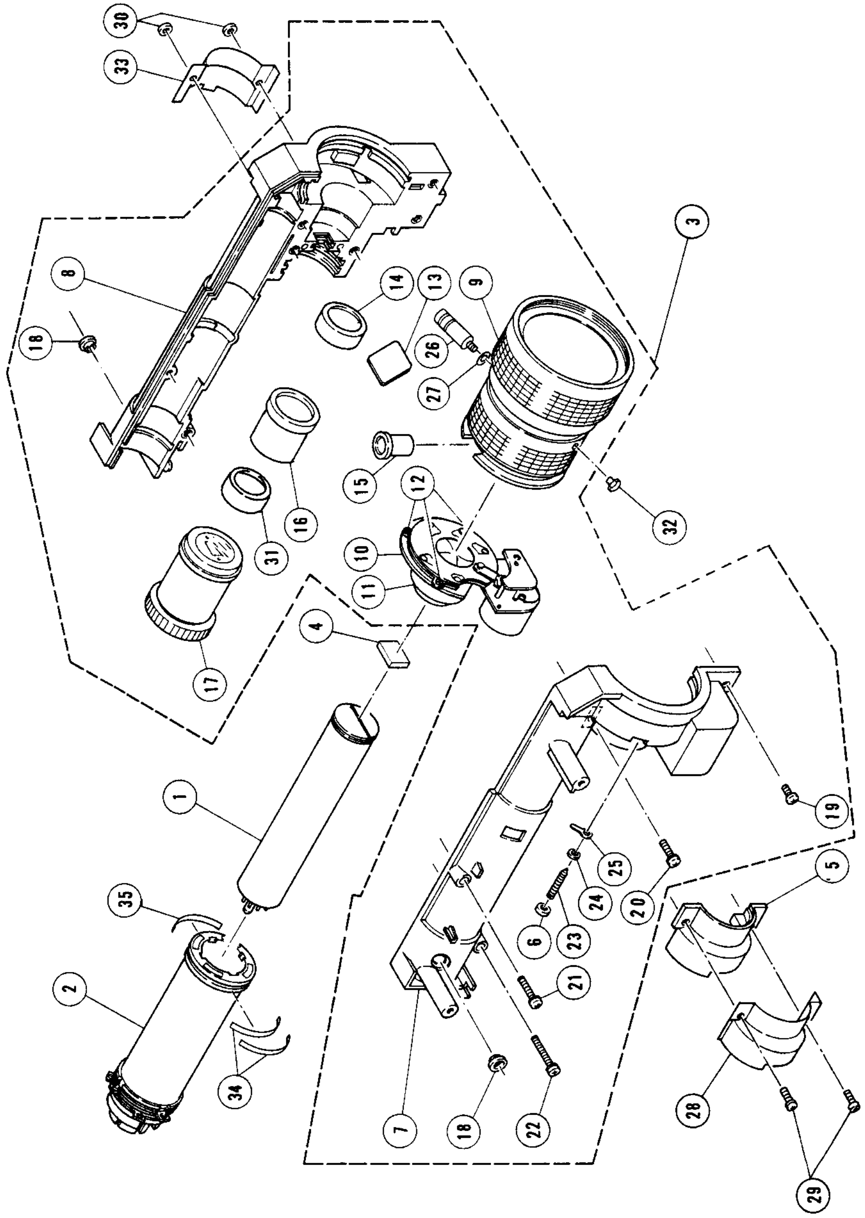
Symbol No.	Part Name	Part Name	Description	Q'ty
1	PU32144C	R. Cabinet Ass'y	Incl:②③ GX-33E	1
	PU32144D	"	Incl: " " GX-66E	"
2	PU47645-2	Plate		1
3	PU48049	Side Mark		1
4	PU47626	Lock Knob		1
5	PU47671	Lock Spring		1
6	PU47627	Plate		1
7	SBSB2003Z	Tapping Screw		2
8	PU32145C	L. Cabinet Ass'y	Incl:⑨ GX-33E	1
	PU32145D	"	Incl: " GX-66E	"
9	PU48049	Side Mark		1
10	–	–		–
11	PU46946	Mic		1
12	PU47611	Tapping Plate		1
13	PU32132	Top Cover	GX-33E	1
	PU32132-2	"	GX-66E	"
14	PU48073C	Head Cover Ass'y	GX-33E	1
	PU48073D	"	GX-66E	"
15	PU48048	Mark		1
16	PU47633	Knob	(VR)	2
17	PU47634-2	Special Screw		2
18	PU48297	Back Plate		1
19	PU48509	Screw		1
20	PU47634-2	Special Screw		1
21	PU48211	Knob	(VR)	1
22	SSBP2605M	Screw		4
23	PU47642	Eye Cup		1
24	PU48492D-2	Lens Cap Ass'y		1
25	PU47643-9	Ser. No. Plate	GX-33E	1
	PU47643-10	"	GX-66E	"
26	–	–		–
27	–	Video Process P.W.B. Ass'y	REF: $\boxed{0}\boxed{4}$	–
28	–	DEF & H.V. P.W.B. Ass'y	REF: $\boxed{0}\boxed{2}$	–
⚠ 29	PU48018-3	Shield Plate		1
30	SWSP2606Z	Screw		3
31	PU47613	Hinge		4
32	PU47684-1-5	Shield Case		1
33	–	S.S.G. P.W.B. Ass'y	REF: $\boxed{0}\boxed{3}$	–
⚠ 34	PU48084	Shield Plate		1
35	PU47685	Shield Cover		1
36	PU47608A	Shield Case Ass'y		1
⚠ 37	–	PRE Amp P.W.B. Ass'y	REF: $\boxed{0}\boxed{1}$	–
38	PU47609-1-3	Shield Cover		1
39	PU47610-1-2	Band		1
40	–	Switch P.W.B. Ass'y	REF: $\boxed{0}\boxed{6}$	–
41	PU47614-2	Spring		1
42	PU47636-2	Sheet		1
43	–	–		–
44	PU47632	Start Knob		1
45	PU32188B-2	Bracket Ass'y	Incl: ㊻ – ㊾	1
46	WSB5000N	Washer		1
47	PU47668	Lever		1
48	T30302-10	Collar		1
49	SDSP3006ZS	Screw		1
50	PU48051-1-3	Heat Sink		1

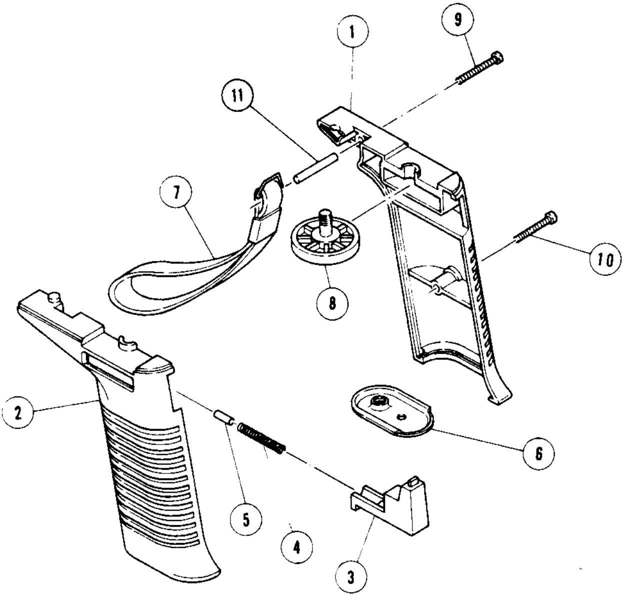
Symbol No.	Part No.	Part Name	Description	Q'ty
51	SPKP3004S	Screw		1
⚠ 52	2SB566C	Transistor	X001	1
53	PU49351-2	Milar Base		1
54	SPBP2606N	Screw		1
55	NNB2600	Nut		2
56	–	VR P.W.B. Ass'y	REF: $\boxed{0}\boxed{8}$	–
57	T30302-8	Collar		3
58	SSBP2606N	Screw		1
59	–	Vidicon Socket P.W.B. Ass'y	REF: $\boxed{0}\boxed{7}$	–
⚠ 60	PU50149	Insulator		1
61	–	Color Comp. P.W.B. Ass'y	REF: $\boxed{0}\boxed{9}$	–
62	PU48240	Socket		1
63	PU48681-1-1	Sticker		1
64	PU48059	Nut		1
65	LPSP2616Z	Screw		1
66	–	–		–
67	PU46146	Caution Label		1
68	–	Mic Amp P.W.B. Ass'y	REF: $\boxed{0}\boxed{5}$	–
69	–	–		–
70	PU50243	Dynamic Focus P.W.B		1

4.3 OPTICAL ASSEMBLY



Symbol No.	Part No.	Part Name	Description	Q'ty
⚠ 1	PUS46247B	Vidicon Ass'y	S4094P Vidicon and PU47605-1-2 Masking Sheet	1
2	PU47592	DEF. Yoke Ass'y		1
3	PU20867C-5	Optical Block Ass'y	GX-33E	1
	PU20867BF	"	GX-66E	"
4	PU47607	Optical L.P.F.		1
5	PU32136-1-2	Vidicon Cover		1
6	PU48059	Nut		1
7	PU10216-1-6	Lens Frame (R)		1
8	PU10217-1-6	Lens Frame (L)		1
9	PU47581-2	Zoom Lens	GX-33E	1
	PU47581-8	"	GX-66E	"
10	PU47583	Servo Eye		1
11	PU47584	Master Lens	GX-33E	1
	PU47584-2	"	GX-66E	"
12	SSSP2004	Screw		3
13	PU47586	Mirror		1
14	PU47587	Field Lens		1
15	PU47585	V.F. Master Lens	GX-33E	1
	PU47585-2	"	GX-66E	"
16	PU47588-1-2	Relay Lens		1
17	PU47589-1-1	Eye Piece	GX-33E	1
	PU47589-2	"	GX-66E	"
18	PU47590-1-4	LED Holder	③ Optical Block Ass'y	2
19	LPSP2608Z	Screw	Note: Change them by Optical Block Ass'y	1
20	LPSP2608Z	"		1
21	LPSP2614Z	"		1
22	LPSP2614Z	"		1
23	TRS2616Z	"		1
24	WLS2600N	Lock Washer		1
25	ML-PU1049	Wire		1
26	PU47582	Zoom Rod		1
27	PU48868-4	Slit Washer		1
28	PU32206-1-4	Shield Case (A)		1
29	SPBP2610N	Screw		2
30	PU48059	Nut		2
31	PU49890	Dust Plate		1
32	PU47998	Cap		1
33	PU32207-1-4	Shield Case (B)		1
34	PU48486-2	Spacer		2
35	PU48486	"		1

4.4 GRIP ASSEMBLY



Symbol No.	Part No.	Part Name	Description	Q'ty
1	PU32134	Grip (A)		1
2	PU32135	" (B)		1
3	PU47615	Start Knob		1
4	PU47616	Spring		1
5	PU47999	Pin		1
6	PU47644	Tapping Plate		1
7	PU47619	Strat Ass'y	⑫ Grip Ass'y	1
8	PU47617	Screw		1
9	SPBP3024MS	"		1
10	SPBP3020MS	"		1
11	PU47618	Tube		1
12	PU32146A	Grip Ass'y		1

4.5 ACCESSORY

Symbol No.	Part No.	Part Name	Description	Q'ty
1	PU30425-281	Instruction Book	GX-33E	1
	PU30425-286	"	GX-66E	"
2	PU47624B	Wind Screen		1
	QPGA007-01003	Poly Bag	for ②	1
3	PU48271	Lens Hood	GX-66E only	1
	QPGA017-02504	Poly Bag	for ③	1
4	PU32146A	Grip Ass'y	See 4.3.	1
	QPGA015-02004	Poly Bag	for ④	1
5	PU32161D	Cemera Cable Ass'y		1
	QPGA017-02505	Poly Bag	for ⑤	1

4.6 PACKING

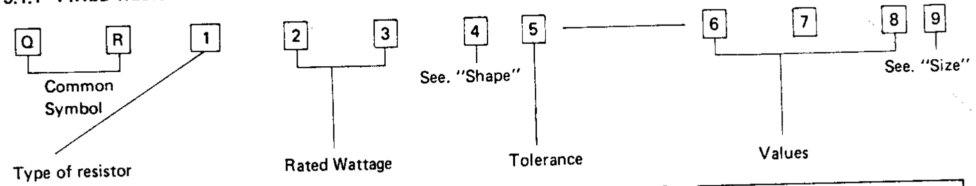
Symbol No.	Part No.	Part Name	Description	Q'ty
1	PUP30434-7	Packing Case	GX-33E	1
	PUP30434-8	"	GX-66E	"
2	PUP30433A	Cushion Ass'y		1
	QPGA020-04005	Poly Bag	for ②	1
3	PUP40329	Ser. No. Sticker		1

SECTION 5
ELECTRICAL PARTS LIST

IMPORTANT SAFETY NOTICE

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

5.1 HOW TO READ THE JVC ELECTRICAL STANDARD PARTS NUMBERS
5.1.1 FIXED RESISTOR CODING



C	Composition Resistor
D	Carbon Resistor
F	Unflamable Resistor
G	Oxide Metal Film Resistor
M	Metal Plate Resistor
X	Metal Film Resistor
W	Wire Wound Resistor
Y	Wire Wound Resistor
V	Metal Film Resistor, High Stability
Z	Special Resistor

Symbol	Rated wattage
16	1/6 (W)
18	1/8 "
14	1/4 "
12	1/2 "
01	1 "
02	2 "
03	3 "
04	4 "
05	5 "
06	6 "
07	7 "
75	7.5 "
08	8 "
10	10 "
15	15 "
20	20 "
30	30 "

Symbol	Tolerance
F	±1 %
G	±2 %
J	±5 %
K	±10 %
M	±20 %

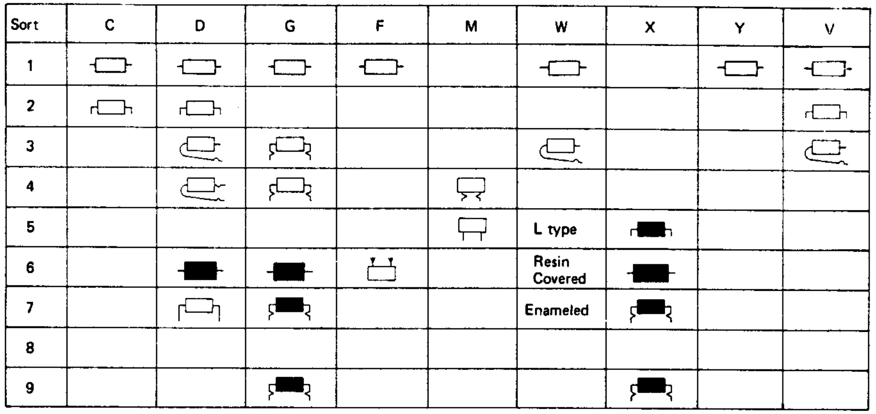
– Example –

R47		0.47 Ω
4R7		4.7 Ω
470	47×10^0	47 Ω
471	47×10^1	470 Ω
472	47×10^2	4.7 KΩ
473	47×10^3	47 KΩ
474	47×10^4	470 KΩ
475	47×10^5	4.7 MΩ
10R2		10.2 Ω
1430	143×10^0	143 Ω
1581	158×10^1	1.58 KΩ

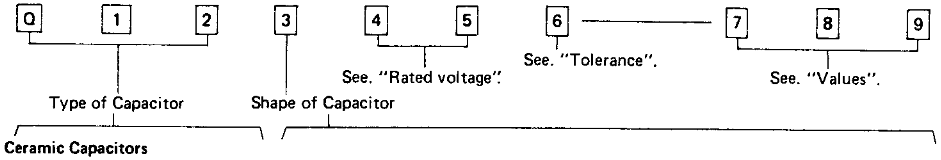
Size

Symbol	Size
A	Small Size
B	Small Size

Shape of resistor (■ : Flame retardant resistor)


Sort
C
D
G
F
M
W
X
Y
V
1
2
3
4
5
6
7
8
9
L type
Resin Covered
Enameled

5.1.2 FIXED CAPACITOR CODING


Q
1
2
3
4
5
6
7
8
9
See. "Rated voltage".
See. "Tolerance".
See. "Values".
Type of Capacitor
Shape of Capacitor

Ceramic Capacitors

Symbol	Type of Capacitor	Disk Lead	Kink Lead	
QCF	Ceramic	1	3	
QCS	"	1	3	
QCY	"	1, 4	3	
QCT	Temperature compensation			
QCZ	Special			

Electrolytic Capacitors

Symbol	Type of Capacitor	Tubular	Mono-direction	Anti-stress	Forming	Snap-in
QEA	Characteristic A	2	4			
QED	Characteristic D	2	4			
QEE	Tantalum		4	5		
QEE	" (small type)		8			
QEN	Non-polar	2	4	5	6	
QET	Characteristic W (small type)	2	4	5	6	
QEW	Characteristic W	2	4	5	6	7
QEZ	Special					

Paper Film Capacitors

Symbol	Type of Capacitor	Tubular	Normal		Flame retardant	
			Mono-direction	Kink Lead	Mono-direction	Kink Lead
QFF	Film mica		4			
QFH	Metalized mylar	2	4	3	5	6
QFM	Mylar	2	4	3, 7	5	6
QFN	" (small type)		4			
QFP	Polypropylene		4	3		
QFS	Polystyrole	2	4	3		
QFZ	Special					

Rated voltage (V)

2nd letter / First letter	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15			6.3				
1	10		16	20	25		40	50	63		35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

Tolerance

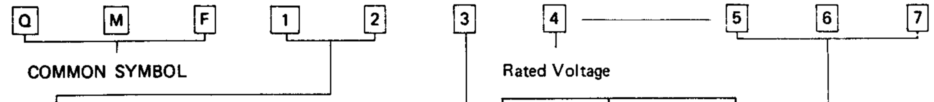
Symbol	F	G	J	K	M	Z	P	A	H	R
(%)	±1	±2	±5	±10	±20	+80 -20	+100 - 0	+100 - 10	+50 -10	+30 -10

Values

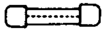
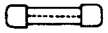
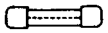
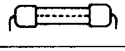
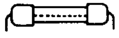
– Example – Values are in picofarads.

101	10×10^1.....	100 pF
102	10×10^2.....	1,000 pF
103	10×10^3.....	10,000 pF = 0.01 μF
104	10×10^4.....	100,000 pF = 0.1 μF
5R0	10×10^5.....	5 pF

5.1.3 FUSE CODING



Shape of Fuse

Symbol No.	Shape	Remarks
51		φ 5.2 x 20
60		φ 6.4 x 30
61		φ 6.35 x 31.8
63		With 60 Lead Wire
66		With 61 Lead Wire

Rated Voltage

Symbol No.	Rated Voltage
1	AC 125 V
2	AC 250 V

Values

R10	0.1 A
R125	0.125 A
1R0	1.0 A
1R2	1.2 A
1R25	1.25 A
100	10 A

Characteristics

Symbol No.	Fusing current	Fusing time	Remarks
S	160%	Within 1 hr.	Anti-rush Type
	200%	" 2 min.	
	700%–2000%	" 0.01 sec.	
R	160%	" 1 hr.	Regular Fusible Type
	200%	" 2 min.	
M	135%	" 1 hr.	Regular Fusible Type (for UL)
	200%	" 2 min.	
U	135%	" 1 hr.	Anti-rush Type (for UL)
	200%	" 2 min.	
	800%–2000%	" 0.01 sec.	
A	210%	" 2 min.	Anti-rush Type (for Europe)
	275%	0.5 – 10 sec.	
	400%	0.15 – 2 sec.	
	1000%	0.02 – 0.3 sec.	
B	210%	Within 30 min.	Regular Fusible Type (for SEMKO, Europe)
	275%	0.05 – 2 sec.	
	400%	0.01 – 0.3 sec.	

5.2 CAMERA CIRCUIT BOARD ASSEMBLY PU47580E-7-M

Symbol No.	Part No.	Part Name	Description	Q'ty
	–	PRE AMP P.W.B. Ass'y	REF: 0 1	–
	–	DEF & H.V. P.W.B. Ass'y	REF: 0 2	–
	–	SSG P.W.B. Ass'y	REF: 0 3	–
	–	VIDEO PROCESS P.W.B. Ass'y	REF: 0 4	–
	–	SWITCH P.W.B. Ass'y	REF: 0 6	–
	–	V. SOCKET P.W.B. Ass'y	REF: 0 7	–
	–	VOLUME P.W.B. Ass'y	REF: 0 8	–
D001	PU44590	L.E. Diode	for REC	1
D002	PU46267	"	for IRIS	1

5.3 PRE AMP P.W.B ASSEMBLY (0 1) PU47577A-M

Symbol No.	Part No.	Part Name	Description	Q'ty
IC 1	KJ13A48	IC		
X 1	2SK218Q, R	FET		
R 1	QRD187J-225	CR		
R 2	" -105	"		
R 3	QRD181J-221A	"		
R 4	" -270A	"		
R 5	" -680A	"		
R 6	" -271A	"		
R 7	" -104A	"		
R 8	" -562A	"		
R 9	–	–		–
R10	QRD181J-101A	CR		
R11	" -334A	"		
C 1	QEW62AA-105	E Cap		
C 2	QFM42AK-273	MY Cap		
C 3	QCT05CH-150	C Cap		
C 4	QAT3001-011	Trimmer Cap		
C 5	QEE40JM-476	T Cap		
C 6	QEE40FM-107	"		
C 7	QEE40JM-476	"		
C 8	QEE41VM-474	"		
C 9	PU48008	C Cap		
L 1	PU47908	Parcival Coil		
L 2	A04096-220	Peaking Coil		

5.4 DEF & H.V. P.W.B. ASSEMBLY (02) PU47574E-M

Symbol No.	Part No.	Part Name	Description	Q'ty
IC 1	AN374P	IC		
IC 2	''	''		
IC 3	D117A47	''		
IC 4	D228W20	''		
IC 5	D328W21	''		
IC 6	UPC1458C	''		
IC 7	5HC1	''		
IC 8	209E37	''		
IC 9	712E36	''		
X 1	2SD638R	Transistor		
X 2	2SB643R	''		
X 3	2SC1567Q	''		
X 4	2SD638R	''		
X 5	2SB643R	''		
⚠X 6	2SC1384Q	''		
⚠X 7	''	''		
X 8	2SD638R	''		
X 9	—	—		—
X10	2SB641Q	Transistor		
X11	2SD636Q	''		
X12	2SB641Q	''		
X13	2SD636Q	''		
D 1	GH-1F	Diode		
⚠D 2	SM-1-08	''		
⚠D 3	''	''		
⚠D 4	''	''		
D 5	1S2473VE	''		
D 6	''	''		
D 7	RD7.5EB	Zener Diode		
R 1	QRD181J-221A	CR		
R 2	'' -182A	''		
R 3	—	—		—
R 4	QRD181J-222A	CR		
R 5	'' -222A	''		
R 6	QVZ3506-222	VR		
R 7	QRD181J-561A	CR		
R 8	'' -101A	''		
R 9	QVZ3506-222	VR		
R10	QRD181J-473A	CR		
R11	'' -473A	''		
R12	—	''		
R13	QVZ3506-103	VR		
R14	QRD181J-150A	CR		
R15	'' -101A	''		
R16	'' -222A	''		
R17	QVZ3506-222	VR		
R18	QRD181J-561A	CR		
R19	QRD142J-330	''		
R20	QRD181J-151A	''		
R21	'' -333A	''		
R22	'' -473A	''		
R23	QRD181J-682A	CR		
R24	QVZ3506-153	VR		
R25	'' -103	''		
R26	QRD181J-103A	CR		
R27	'' -103A	''		
R28	'' -104A	''		
R29	'' -562A	''		
R30	QVZ3507-105	VR		
R31	QRD181J-683A	CR		
R32	'' -823A	''		
R33	'' -104A	''		
R34	'' -563A	''		
R35	'' -103A	''		
R36	QVZ3506-473	VR		
R37-	QRD181J-103A	CR		
R38	QVZ3506-473	VR		
R39	QVZ3506-102	''		
R40	QRD187J-152A	''		
R41	'' -103A	''		
R42	QVZ3506-473	VR		
R43	QRD181J-103A	CR		
R44	QVZ3506-473	VR		
R45	QRD181J-152A	CR		
R46	QVZ3506-471	VR		
R47	QRD181J-331A	CR		
⚠R48	'' -334A	''		
R49	—	—		—
⚠R50	QRV121F-8203M	CMF R		
⚠R51	'' -1504M	''		
⚠R52	QVZ3501-684	VR		
⚠R53	QRV121F-8203M	CMF R		
⚠R54	QRD181J-474A	CR		
⚠R55	'' -102A	''		
⚠R56	QVZ3501-224	VR		
R57	QRD181J-102A	CR		
R58	'' -151A	''		
R59	'' -151A	''		
R60	'' -102A	''		
R61	'' -562A	''		
R62	'' -223A	''		
R63	'' -104A	''		
R64	QVZ3506-104	VR		
R65	QRD181J-104A	CR		
R66	'' -103A	''		
R67	'' -104A	''		
R68	'' -222A	''		
R69	'' -822A	''		
R70	'' -562A	''		
R71	'' -101A	''		
R72	PU47597-202	VR		
R73	QRD181J-472A	CR		
R74	QVZ3506-222	VR		
R75	—	—		—
R76	—	—		—
R77	QRD181J-152A	CR		
R78	'' -821A	''		
R79	'' -103A	''		

Symbol No.	Part No.	Part Name	Description	Q'ty
R80	QVZ3506-473	VR		
R81	QRD181J-103A	CR		
R82	QVZ3506-473	VR		
R83	QRD181J-100A	CR		
R84	–	–		–
R85	QRD187J-273A	CR		
R86	" -124A	"		
R87	–	–		–
R88	QVZ3507-474	VR		
R89	" -474	"		
R90	QRD181J-103A	CR		
R91	" -103A	"		
R92	QVZ3506-473	VR		
R93	" -473	"		
R94	QRD181J-393A	CR		
R95	QVZ3506-153	VR		
R96	QRD181J-393A	CR		
R97	" -103A	"		
R98	–	–		–
R99	–	–		–
R100	–	–		–
R101	–	–		–
R102	–	–		–
R103	QRD181J-393A	CR		
R104	ERT-D2FHL104S	Thermister		
R105	QRD181J-683A	CR		
R106	" -681A	"		
R107	ERT-D2FHL104S	Thermister		
R108	QRD181J-101A	CR		
R109	ERT-D2FHL750S	Thermister		
C 1	QEE41CM-106	T Cap		
C 2	QFM31HJ-272	MY Cap		
C 3	" -332	"		
C 4	QEC81AM-227	E Cap		
C 5	QET61AR-107	"		
C 6	QEE41CM-106	T Cap		
C 7	QEE41CM-106	"		
C 8	QFM41HJ-152	MY Cap		
C 9	QCF31HP-223	C Cap		
C10	" -103	"		
C11	QEV40JR-477	E Cap		
C12	QFM31HJ-153	MY Cap		
C13	QFM41HJ-563	"		
C14	QEE81AM-476	T Cap		
C15	" -476	"		
C16	QCF31HP-103	C Cap		
C17	QEE81AM-476	T Cap		
C18	QEV41HR-105	E Cap		
C19	QEE81AM-476	T Cap		
C20	QEV41HR-475	E Cap		
C21	QEE41CM-106	T Cap		
C22	" -106	"		
C23	QEE81AM-476	"		
C24	" -476	"		
⚠ C25	QFM42GK-333	MY Cap		

Symbol No.	Part No.	Part Name	Description	Q'ty
⚠ C26	QFH52BK-103	"		
⚠ C27	QFM42GK-103	"		
⚠ C28	QEW62CA-105	E Cap		
⚠ C29	QFH42GK-104	MY Cap		
⚠ C30	" -104	"		
⚠ C31	QEW42CA-475	E Cap		
⚠ C32	QEW42CA-475	E Cap		
C33	QEV41AR-477	"		
C34	QEE81AM-476	T Cap		
C35	" -476	"		
C36	QET61HR-105	E Cap		
C37	QET61ER-107	"		
C38	QET61CR-476	"		
C39	QFM31HJ-473	MY Cap		
C40	–	–		–
C41	QEV41AR-477	E Cap		
C42	QEE81AM-476	T Cap		
C43	QET61CR-476	E Cap		
C44	–	–		–
C45	QEV41CR-227	E Cap		
C46	QEV61HR-335	"		
C47	–	–		–
C48	QFN41HJ-102	MY Cap		
C49	QFN41HK-104	"		
C50	QCS11HJ-221	C. Cap		
C51	" -331	"		
L 1	PU30284-67RN	Choke Coil		
L 2	PU42875-271	Peaking Coil		
L 3	PU43159	Choke Coil		
T 1	PU46881	Transformer		1
⚠ T 2	PU47594-BS	DC-DC Converter Unit		1
S 1	PU47598	Rotary Switch	S1	1
⚠ F 1	QMF51A2-1R0-BS	Fuse		1
FC-1	A44594-001	Fuse Clip		2
	PU45908	Test Pin		6
	PU43351-3	Cap Housing	P3, 5	2
	" -4	"	P6	1
	" -6	"	P4	1
⚠	PU48295	Thermal Fuse (1)	for X6, 7	1
⚠	"	" (2)	for X001	1

5.5 SSG P.W.B. ASSEMBLY (0 3) PU47575E-M

Symbol No.	Part No.	Part Name	Description	Q'ty
IC 1	HD44007	IC		
IC 2	MSM4049	" (or UPD4049C)		
IC 3	MSM4050	" (or UPD4050C)		
IC 4	HA17555PS	"		
IC 5	MSM4071	" (or UPD4071C)		
D 1	RD6.8EB1	Zener Diode		
D 2	1SV68	Diode		
R 1	QRD181J-473A	CR		
R 2	" -680A	"		
R 3	" -105A	"		
R 4	" -104A	"		
R 5	" -223A	"		
R 6	" -105A	"		
R 7	" -105A	"		
R 8	" -222A	"		
R 9	" -682A	"		
R10	QRD187J-4R7A	"		
C 1	QEE81AM-476	T Cap		
C 2	QFM41HJ-102	MY Cap		
C 3	QCF11EZ-103	C Cap		
C 4	QEE81AM-476	T Cap		
C 5	QCT05CH-330	C Cap		
C 6	QCF11EZ-103	"		
C 7	" -103	"		—
C 8	—	—		—
C 9	—	—		
C10	QEE41VM-474	T Cap		
C11	" -474	"		
C12	QCT05CH-220	C Cap		
C13	" -120	"		
C14	QAT3001-011	Trimmer Cap		
L 1	PU32139-3	Coil		
S 1	PU47599	Push Switch		1
X'tal-1	PU47145	Crystal		1

5.6 VIDEO PROCESS P.W.B. ASSEMBLY (0 4) PU47573E-M

Symbol No.	Part No.	Part Name	Description	Q'ty
IC 1	D225U11	IC		
IC 2	AN610P	"		
IC 3	D226U09	"		
IC 4	D228U10	"		
IC 5	D327S15	"		
IC 6	D222U12A	"		
IC 7	KJ13C08	"		
IC 8	AN612	"		
IC 9	AN614	"		
IC10	AN612	"		
IC11	UPC596C	"		
IC12	D225U08A	"		
IC13	AN614	"		
IC14	AN612	"		
IC15	AN614	"		
IC16	AN612	"		
IC17	UPC596C	"		
IC18	D225U08A	"		
IC19	AN614	"		
X 1	2SK40C	FET		
D 1	1S2473	Diode		
D 2	MA26	"		
D 3	MA26T-A	"		
D 4	"	"		
D 5	—	—		—
D 6	—	—		—
D 7	1S2473	Diode		
D 8	"	"		
D 9	MA26	"		
D10	—	—		
D11	—	—		—
D15	MA26W	Diode		
D16	RD6.2EB2	Zener Diode		
D17	MA26W	Diode		
R 1	QRD181J-391A	CR		
R 2	" -331A	"		
R 3	" -222A	"		
R 4	" -332A	"		
R 5	" -682A	"		
R 6	" -682A	"		
R 7	—	—		—
R 8	QRD181J-471A	CR		
R 9	" -471A	"		
R10	" -821A	"		
R11	" -561A	"		
R12	" -391A	"		
R13	" -391A	"		
R14	QRD141J-750	"		
R15	QVZ3506-472	VR		
R16	" -222	"		
R17	" -221	"		
R18	QRD181J-151A	CR		
R19	QRD187G-223A	"		

Symbol No.	Part No.	Part Name	Description	Q'ty
R20	QRD181J-471A	CR		
R21	QVZ3506-472	VR		
R22	QRD181J-682A	CR		
R23	QVZ3506-222	VR		
R24	QRD181J-103A	CR		
R25	" -472A	"		
R26	QVZ3506-103	VR		
R27	QRD181J-822A	CR		
R28	" -561A	"		
R29	" -223A	"		
R30	QVZ3506-223	VR		
R31	QRD181J-103A	CR		
R32	QVZ3506-222	VR		
R33	QRD181J-152A	CR		
R34	" -331A	"		
R35	" -122A	"		
R36	" -680A	"		
R37	" -271A	"		
R38	" -122A	"		
R39	" -561A	"		
R40	" -561A	"		
R41	" -223A	"		
R42	–	–		–
R43	QRD181J-103A	CR		E
R44	" -682A	"		
R45	" -332A	"		
R46	QVZ3506-472	VR		
R47	" -222	"		
R48	QRD181J-222A	CR		
R49	QRD187J-682A	"		
R50	" -472A	"		
R51	" -472A	"		
R52	" -102A	"		
R53	QVZ3506-104	VR		
R54	QRD181J-472A	CR		
R55	QVZ3506-103	VR		
R56	QRD181J-103A	CR		
R57	QRD143K-185	"		
R58	QVZ3506-472	VR		
R59	QRD181J-472A	CR		
R60	QVZ3506-222	VR		
R61	QRD181J-472A	CR		
R62	" -103A	"		
R63	" -331A	"		
R64	" -471A	"		
R65	" -680A	"		
R66	" -271A	"		
R67	" -682A	"		
R68	" -332A	"		
R69	" -390A	"		
R70	" -122A	"		
R71	QVZ3506-102	VR		
R72	" -681	"		
R73	QRD181J-103A	CR		
R74	" -103A	"		
R75	" -682A	"		
R76	–	–		–

Symbol No.	Part No.	Part Name	Description	Q'ty
R77	QRD181J-103A	CR		
R78	" -682A	"		
R79	" -332A	"		
R80	QVZ3506-472	VR		
R81	" -102	"		
R82	QRD181J-472A	CR		
R83	" -472A	"		
R84	" -102A	"		
R85	" -391A	"		
R86	QVZ3506-103	VR		
R87	QRD181J-103A	CR		
R88	QRD143K-185	"		
R89	QVZ3506-472	VR		
R90	QRD181J-472A	CR		
R91	QVZ3506-222	VR		
R92	QRD181J-472A	CR		
R93	" -331A	"		
R94	" -471A	"		
R95	" -680A	"		
R96	" -271A	"		
R97	" -682A	"		
R98	" -332A	"		
R99	" -101A	"		
R100	" -470A	"		
R101	" -4R7A	"		
R102	" -473A	"		
R103	" -154A	"		
R104	" -104A	"		
R105	" -561A	"		
R106	–	–		–
R107	QRD181J-153A	CR		
R108	–	–		–
R109	–	–		–
R110	QRD181G-104A	CR		
R111	–	–		–
R112	–	–		–
R113	QVZ3507-334	VR		
R114	QRD181J-824A	CR		
R115	–	–		–
R116	–	–		–
R117	QRD181J-272A	CR		
R118	" -392A	"		
R119	" -680A	"		
R120	–	–		–
R121	–	–		–
R122	QRD181J-682A	CR		
R123	" -332A	"		
R124	" -821A	"		
R125	" -821A	"		
R126	–	–		–
R127	–	–		–
R128	–	–		–
R129	–	–		–
R130	QRD181J-681A	CR		
R131	" -182A	"		
R132	" -222A	"		
R133	" -822A	"		

Symbol No.	Part No.	Part Name	Description	Q'ty
R134	–	–		–
R135	QRD181J-183A	CR		
R136	" -470A	"		
R137	" -224A	"		
R138	" -153A	"		
R139	" -103A	"		
R140	–	–		–
R141	–	–		–
R152	ERT-D2FHL104	Thermister		
R154	QRD181J-682A	CR		
R157	QRD181J-472A	"		
R158	" -472A	"		
C 1	QEE40FM-107	T Cap		
C 2	QET61AR-476	E Cap		
C 3	QEE81AM-476	T Cap		
C 4	QEE41EM-105	"		
C 5	QCS11HJ-561	C Cap		
C 6	QCS11HJ-471	"		
C 7	QEE41CM-106	T Cap		
C 8	QCS31HJ-101	C Cap		
C 9	QET61AR-107	E Cap		
C10	QEE81AM-476	T Cap		
C11	–	–		–
C12	PU47596-400	Trimmer Cap		
C13	" -400	"		
C14	–	–		–
C15	QCF31HP-103	C Cap		
C16	" -103	"		
C17	" -103	"		
C18	" -103	"		
C19	" -103	"		
C20	" -103	"		
C21	QEE41CM-106	T Cap		
C22	QCF31HP-103	C Cap		
C23	" -103	"		
C24	" -103	"		
C25	QCS31HJ-270	"		
C26	QET61CR-106	E Cap		
C27	QET61AR-476	"		
C28	QET61CR-106	"		
C29	QCF31HP-103	C Cap		
C30	" -103	"		
C31	" -103	"		
C32	" -103	"		
C33	QEE41CM-106	T Cap		
C34	QCF31HP-103	C Cap		
C35	" -103	"		
C36	" -103	"		
C37	QFM31HJ-102	MY Cap		
C38	QCS31HJ-270	C Cap		
C39	QET61CR-106	E Cap		
C40	QET61AR-476	"		
C41	QET61CR-106	"		
C42	QCF31HP-103	C Cap		
C43	QEE41CM-475	T Cap		

Symbol No.	Part No.	Part Name	Description	Q'ty
C44	QET61CR-107	E Cap		
C45	QCF31HP-223	C Cap		
C46	QET61CR-107	E Cap		
C47	QCF31HP-223	C Cap		
C48	QCF31HP-223	C Cap		
C49	QCF11HP-223	"		
C50	QCF31HP-223	"		
C51	" -223	"		
C52	" -223	"		
C53	" -223	"		
C54	" -223	"		
C55	" -223	"		
C56	–	–		–
C57	QCS11HJ-470	C Cap		
C58	" -470	"		
C59	QFM41HJ-102	MY Cap		
C60	–	–		–
C61	–	–		–
C62	QCS11HJ-680	C Cap		
C63	" -680	"		
C64	–	–		–
C65	QCS11HJ-100	C Cap		
C66	QEE41CM-106	T Cap		
C71	QFN41HK-102	MY Cap		
C72	QCS11HJ-470	C Cap		
C73	QEE41AM-156	T Cap		
C75	QCS11HJ-150	C Cap		
L 1	A04096-150	Peaking Coil		
L 2	PU30770-4	Coil		
L 3	–	–		–
L 4	A04096-15	Peaking Coil		
L 5	PU30770-4	Coil		
L 6	" -7	"		
L 7	–	–		–
L 8	PU30770-4	Coil		
L 9	" -7	"		
L10	A04096-27	Peaking Coil		
LPF 1	PU31932-1	Filter		
LPF 2	PU32141-2	"		
LPF 3	PU32140	"		
LPF 4	"	"		
BPF 1	PU32142-1	Filter		
EQ 1	PU31933-1	Equalizer		
DL 1	PU48200	1-H Delay Line		
	PU43351-2	Cap Housing	P2	1
	PU45908	Test Pin		14

5.7 MIC AMP P.W.B. ASSEMBLY ($\boxed{0}\boxed{5}$) PU48552F

Symbol No.	Part No.	Part Name	Description	Q'ty
IC 1	UPC4558C	IC		
R 1	QRD187J-222A	CR		
R 2	″ -104A	″		
R 3	″ -104A	″		
R 4	″ -102A	″		
R 5	″ -334A	″		
R 6	″ -101A	″		
R 7	″ -221A	″		
C 1	QEE41VM-154	T Cap		
C 2	QCS11HJ-151	C Cap		
C 3	QEE81AM-476	T Cap		
C 4	QEE41AM-106	″		
	PU49906A	Audio Trap PWB Ass'y		
	PU49338	Mini P.W.B.		
L 1	PU49337	fH/2 Coil		
R11	QRD187J-123A	CR		

5.8 SWITCH P.W.B. ASSEMBLY ($\boxed{0}\boxed{6}$) PU47579A-M

Symbol No.	Part No.	Part Name	Description	Q'ty
R 1	QRD187J-223A	CR		
R 2	″ -393A	″		
R 3	″ -333A	″		
R 4	″ -333A	″		
R 5	″ -333A	″		
R 6	″ -333A	″		
R 7	″ -104A	″		
R 8	″ -274A	″		
R 9	″ -274A	″		
R10	″ -224A	″		
	PU48248	Slide Switch		1

5.9 VIDICON SOCKET P.W.B. ASSEMBLY ($\boxed{0}\boxed{7}$) PU47578A

Symbol No.	Part No.	Part Name	Description	Q'ty
D 1	RD3.0FB	Diode		
⚠R 1	QRD141J-475	CR		
⚠R 2	QRV121F-4704M	MF R		
⚠C 1	PU47600-223J0	P Cap		
	PU47604	Vidicon Socket		1

5.10 VOLUME P.W.B. ASSEMBLY ($\boxed{0}\boxed{8}$) PU48246A

Symbol No.	Part No.	Part Name	Description	Q'ty
R 1	QRD187J-183	CR		
R 2	PU48247	VR		
R 3	QRD187J-183	CR		

5.11 COLOR COMP P.W.B. ASSEMBLY ($\boxed{0}\boxed{9}$) PU48502B

Symbol No.	Part No.	Part Name	Description	Q'ty
IC 1	AN612	IC		
IC 2	UPC596C	″		
IC 3	AN608P	″		
D 1	–	–		–
R 1	QRD187J-123A	CR		
R 2	″ -561A	″		
R 3	″ -122A	″		
R 4	″ -222A	″		
R 5	″ -222A	″		
R 6	QVZ3508-223	VR		
R 7	QRD187J-182A	CR		
R 8	QVZ3506-102	VR		
R 9	QRD181J-473A	CR		
C 1	QFM41HK-102	MY Cap		
C 2	QCS11HJ-820	C Cap		
C 3	QEE40JM-106	T Cap		
C 4	″ -106	″		
C 5	QFM41HK-102	MY Cap		
C 6	QEE40JM-106	T Cap		
C 7	″ -106	″		
C 8	QFM41HK-152	MY Cap		
C 9	QEE41CR-476	T Cap		
C10	QCF11HP-102	C Cap		
C11	QCS11HJ-680	″		
C12	QFM41HK-563	MY Cap		
DL 1	PU48557-2	1-H Delay Line	or PU49428-2	
	PU43351-6	Cap Housing	P7	1

No. 8172-B

JVC Service Manual

CAMERA
POWER
ON
OFF
JVC
CAMERA ADAPTER
MADE IN JAPAN

MODEL GA-23E

VICTOR COMPANY OF JAPAN, LIMITED

SECTION 1
GENERAL DESCRIPTION

1.1 INTRODUCTION

This manual provides service information for the JVC Camera Adapter Model GA-23EG and GA-23EK.

The manual describes the principles and adjustments of mechanical/electrical operations.
Service procedures given herein cover only field maintenance services. Adjustments which require high-level instruments, jigs and techniques are excluded, since they should be performed at a JVC Regional Center for factory service.

Due to design modifications, the servicing procedures and data given in this manual are subject to possible change without prior notice.

WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

1.2 SPECIFICATIONS

Rated output voltage : DC 12 V
Rated output current : 1.1 A
Remote control terminal : Provided for the connection of a recorder having pause remote control capability.
Power requirement : 110/120/220/240 V∿ (selectable), 50 Hz
Power consumption : 30 W
Operating temperature: 0°C ~ 40°C (32°F ~ 104°F)
Dimensions : 105 (W) x 87 (H) x 207 (D) mm (4-3/16" x 3-7/16" x 8-3/16")
Weight : 1.5 kg (3.4 lbs.)

Note:
The rating plate is on the bottom of the unit.

1.3 PRECAUTIONS

- Be careful NOT to block the ventilation openings. Heat is generated inside the unit.
- Do NOT use the unit stood up vertically or turned upside down.
- Do NOT apply violent shocks to the unit.
- Do NOT carry the unit while it remains connected to the camera or recorder.
- Do NOT disassemble the unit nor remove the cabinet.
- Do NOT allow inflammables, water or metallic objects to enter the unit.

POWER SYSTEM

Connection to the mains supply
The operating voltage of this camera adapter is preset to 220 V or 240 V∿ at the factory.
Before connecting to mains, check that the voltage selector on the rear panel is set to the same voltage as your local mains supply.

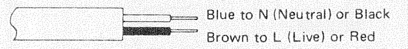
Adapting to local power line
This camera adapter operates on either 110, 120, 220 or 240 V∿. If the preset voltage differs from that in your area, insert a small screwdriver into the slot and turn the voltage selector so that correct voltage is aligned with the arrow. Regarding this setting, consult your JVC dealer.

IMPORTANT
(In the United Kingdom)

Mains Supply
(AC 240 V∿, 50 Hz only)

IMPORTANT

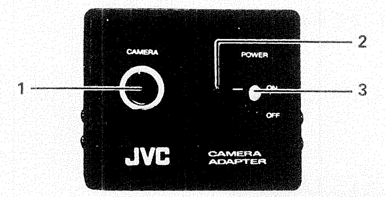
Do not make any connection to the Larger Terminal coded E or Green. The wires in the mains lead are coloured in accordance with the following code:



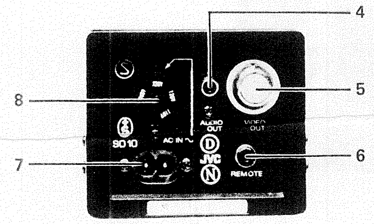
If these colours do not correspond with the terminal identification of your plug, connect as follows: Blue wire to terminal coded N (Neutral) or coloured Black. Brown wire to terminal coded L (Live) or coloured Red.

Note:
We recommend that you should disconnect the AC cord from the outlet.

1.4 CONTROLS AND CONNECTORS


1
2
3
CAMERA
POWER
ON
OFF
JVC
CAMERA ADAPTER

(a) Front


4
5
6
7
8
AUDIO OUT
VIDEO OUT
AC IN ~
SO 10
REMOTE

(b) Rear

Fig. 1-1

1. **CAMERA terminal**
   Connect the camera cable to this terminal.
2. **Power indicator**
   Lights red when the POWER switch is set to ON.
3. **POWER switch**
   Set to ON to supply power and to OFF to remove power.
4. **AUDIO OUT terminal**
   Audio signals from the camera are available from this terminal
5. **VIDEO OUT terminal**
   Video signals from the camera are available from this terminal.
6. **REMOTE terminal**
   Connect to the PAUSE REMOTE terminal of the VHS recorder using the remote control cable provided.
7. **AC IN socket**
   Connect to an AC outlet using the power cord provided.
8. **Voltage selector**
   Set to the power supply voltage in your area.

1.5 CONNECTION

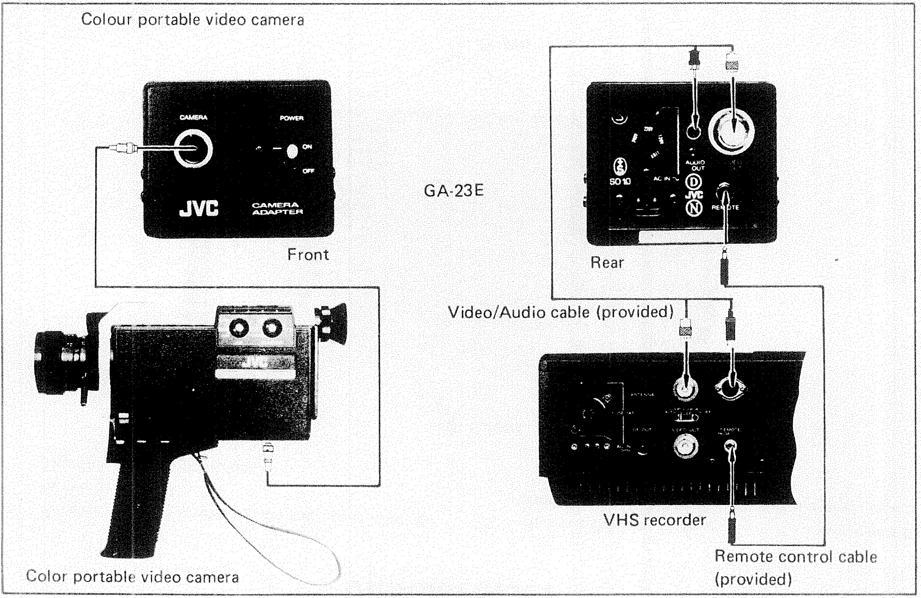

Colour portable video camera
CAMERA
POWER
ON
OFF
JVC
CAMERA ADAPTER
Front
GA-23E
Rear
Video/Audio cable (provided)
VHS recorder
Remote control cable (provided)
Color portable video camera

Fig. 1-2

1. Connect the camera cable to the CAMERA connector of this unit.
2. Connect the two plugs of the supplied video/audio cable on one end to the VIDEO OUT and AUDIO OUT terminals.
3. Connect the two plugs on the other end to the VIDEO IN and AUDIO IN terminals of the recorder.
4. Using the supplied remote control cable, connect between the REMOTE terminal of this unit and the PAUSE REMOTE terminal of the recorder. (HR-3600E)
   The HR-3300E is not supplied with a remote control terminal, so the camera's start/stop switch does not function when used in combination with the HR-3300E.

1.6 OPERATION

With the HR-3600E

1. Power the adapter, recorder and TV receiver.

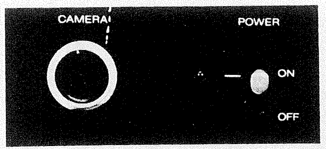

CAMERA
POWER
ON
OFF

Fig. 1-3

2. Set the recorder's REC SELECT switch to AUX.
3. Select the TV receiver channel that corresponds to the RF converter output.

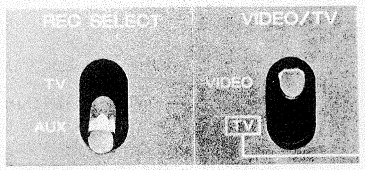

REC SELECT
TV
AUX
VIDEO/TV
VIDEO
TV

Fig. 1-4

4. Make sure that the camera's start/stop switch is set to STOP.

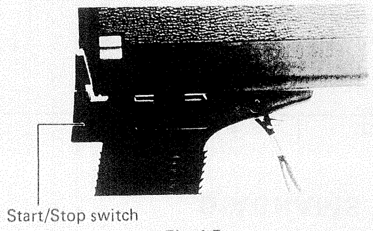

Start/Stop switch

Fig. 1-5

5. Depress the recorder's REC and PLAY keys simultaneously.
6. Start recording by setting the camera's start/stop switch to START.

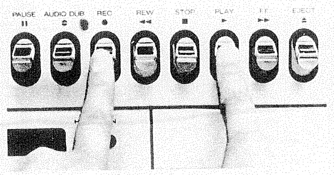

PAUSE
AUDIO DUB
REC
REW
STOP
PLAY
FF
EJECT

Fig. 1-6

SECTION 2
DISASSEMBLY

1. Remove the four screws ① on the upper case as shown in Fig. 2-1.
Then lift up the upper case.

2. Remove the two screws ② on the lower case as shown in Fig. 2-2, and then put off the lower case.

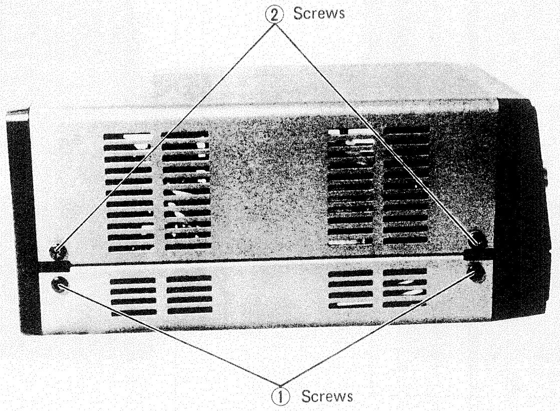

② Screws
① Screws

Fig. 2-1

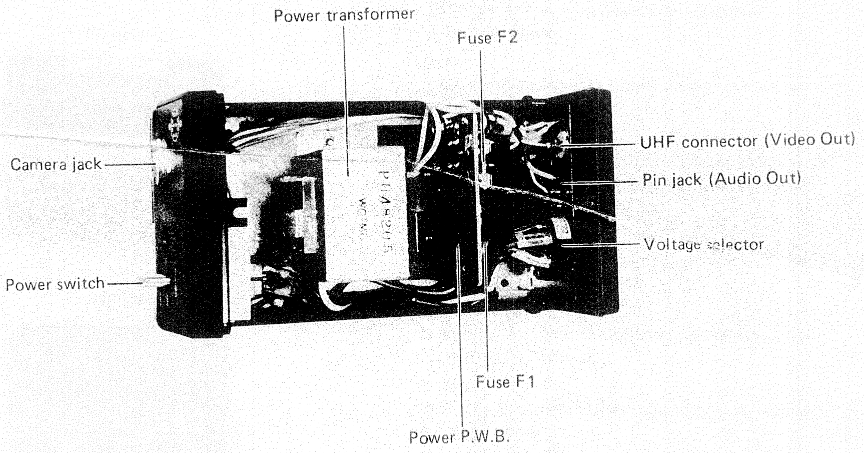

Power transformer
Fuse F2
UHF connector (Video Out)
Camera jack
Pin jack (Audio Out)
Voltage selector
Power switch
Fuse F1
Power P.W.B.

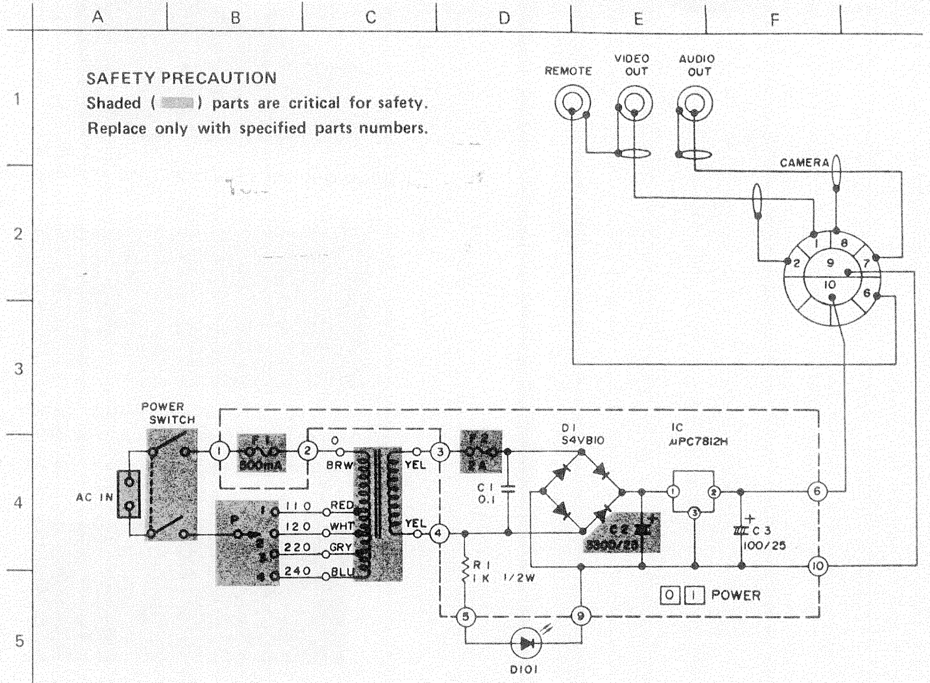
Fig. 2-2 Location of principal parts

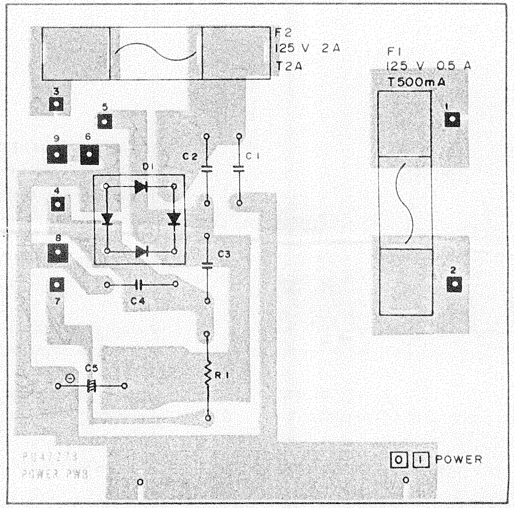
SECTION 3
DIAGRAMS AND CIRCUIT BOARDS

SAFETY PRECAUTION

Shaded (▨) parts are critical for safety.

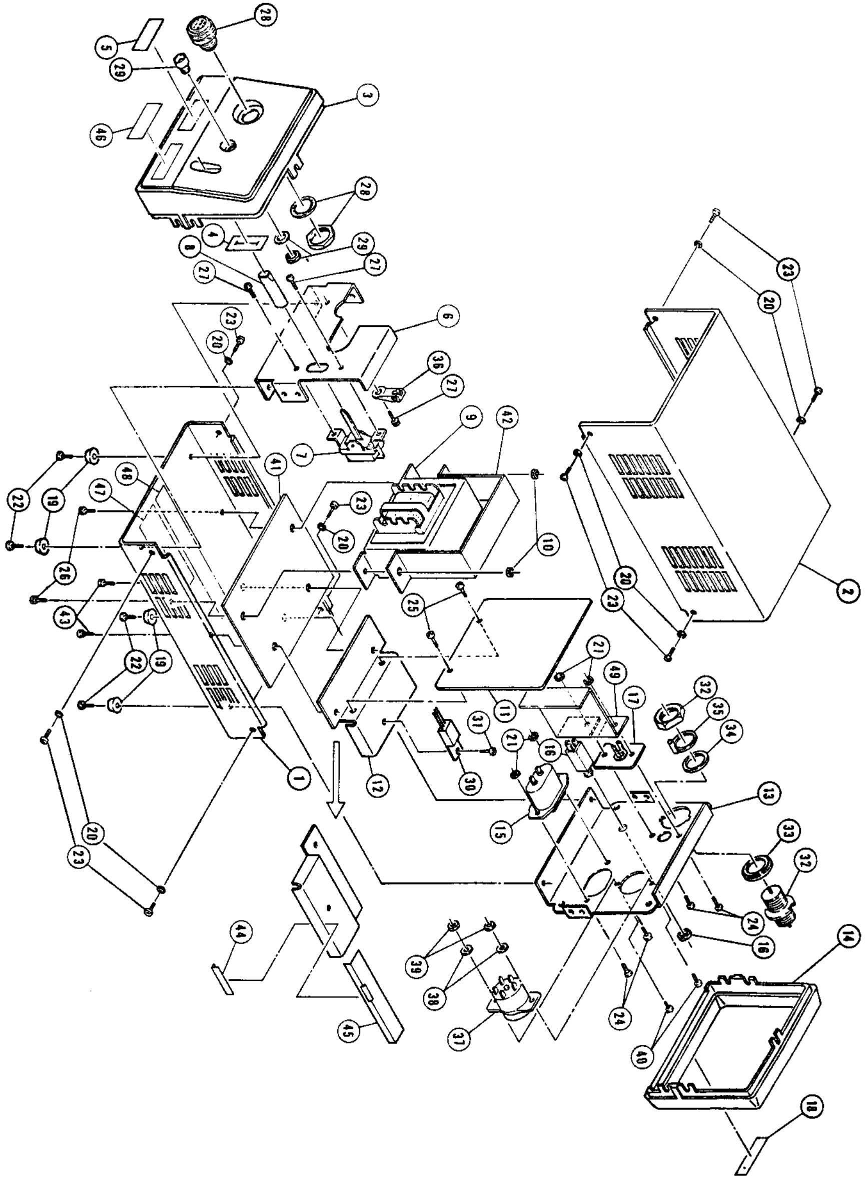
Replace only with specified parts numbers.


A
B
C
D
E
F
1
2
3
4
5
REMOTE
VIDEO OUT
AUDIO OUT
CAMERA
1
2
6
7
8
9
10
POWER SWITCH
AC IN
F1
500mA
0
BRW
YEL
P
1
2
3
4
110
120
220
240
RED
WHT
GRY
BLU
YEL
F2
2A
C1
0.1
D1
S4VB10
IC
μPC7812H
C2
3300/25
C3
100/25
R1
1K 1/2W
0 I POWER
D101


6
7
8
9
F2
125 V 2A
T2A
F1
125 V 0.5 A
T500mA
3
5
9
6
1
C2
C1
D1
4
8
C3
C4
7
2
C5
R1
PU47213
POWER PWB
0 I POWER

SAFETY PRECAUTION
Parts identified by the ⚠ symbol are critical for safety. Replace only with specified parts numbers.

Symbol No.	Part No.	Part Name	Description	Q'ty
1	PU31961-4-8	Lower Case		1
2	PU31960-4-6	Upper Case		1
3	PU31962	Front Panel		1
4	PU47061-2	Felt		1
5	PU45552-5	Mark		1
6	PU47266	Front Bracket		1
7	⚠ PU47274-BS	Lever Switch		1
8	PU47267	Knob		1
9	⚠ PU48205-BS	Power Transformer		1
10	NNB4000ZS	Nut		2
11	—	Power P.W.B. Ass'y		1
12	PU32349	Heat Sink		1
13	PU31959-3	Connector Panel	GA-23EG	1
	" -5	"	GA-23EK	1
14	PU31963	Rear Frame		1
15	⚠ QMC9017-001-BS	AC Connector	AC IN	1
16	PU47500	Remote Jack Ass'y	REMOTE	1
17	PU42930	Pin Jack	AUDIO OUT	1
18	PU47062	Serial No. Sticker		1
19	PU42848-2	Foot		4
20	Q03093-802	Nylon Washer		8
21	NNS3000ZS	Nut		4
22	SDBP3006MS	Screw		4
23	SDBP3006MS	"		8
24	⚠ SDBP3008MS	"		4
25	DPSP3006ZS	"		2
26	SPSP4010ZS	"		2
27	LPSP3006ZS	"		3
28	PU47277A	Camera Connector		1
29	PU45616	L.E.D.	D101	1
30	UPC7812H	Integrated Circuit	2C1	1
31	LPSP3006ZS	Screw		1
32	GU45073-2	Video Connector	VIDEO OUT	1
33	PU47640	Insulator		1
34	PU47641	Washer		1
35	GU45074	Earth Lug		1
36	PU43981	Holder		1
37	⚠ QSR0074-001-BS	Voltage Selector		1
38	WNS3000N	Washer		2
39	NNS3000ZS	Nut		2
40	⚠ SDBP3008MS	Screw		2
41	PU48298	Transformer Bracket (1)		1
42	PU48299	" " (2)		1
43	DPSP3008ZS	Screw		2
44	PU43135-2-30	Nylon Edging		1
45	⚠ PU48500	Insulator		1
46	TJL000420	Sticker	Only GA-23EK	1
47	PU48210	Rating Lavel	Only GA-23EG	1
	PU48210-2	"	Only GA-23EK	1
48	PU46146	Sticker		1
49	⚠ PU50385	Barrier		1



4.1 EXPLODED VIEW

SECTION 4
EXPLODED VIEW AND PARTS LIST

4.2 ACCESSORY

Symbol No.	Part No.	Part Name	Description	Q'ty
1	PU30425-282	Instruction Book	GA-23EG	1
	PU30425-283	"	GA-23EK	"
2	PU32004	Guaranty Card	Only GA-23EK	1
3	GK341328-6	Poly Bag	for ①, ②	1
4	⚠ QMP3950-183(V)	Power Cord	GA-23EG	1
	⚠ PU46128-BS	"	GA-23EK	"
5	PU47356A	Video/Aodio Cable		1
6	PU46315	Remote Cable Ass'y		1
7	QPGA025-03505	Poly Bag	for ④, ⑤, ⑥	1

4.3 PACKING

Symbol No.	Part No.	Part Name	Description	Q'ty
1	PUP30362-12	Packing Case	⑤	1
2	PUP30362-4	Supporter		1
3	PUP30363	Front Cashion		1
4	PUP30364	Rear Cushion		1
5	PUP30362J	Packing Case Ass'y	GA-23EG	1
	PUP30362K	"	GA-23EK	"
6	QPGA020-03005	Poly Bag	for a set	1

SECTION 5
ELECTRICAL PARTS LIST

1. **SAFETY PRECAUTION**

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

2. **Abbreviations in this list are as follows:**

RESISTORS – All resistance values are in ohms (Ω).

K	:	1 000
M	:	1 000 000
CR	:	Carbon Resistor
Comp. R	:	Composition Resistor
WR	:	Wire Wound Resistor
OMR	:	Oxide Metal Film Resistor
VR	:	Variable Resistor (Potentiometer)
MFR	:	Metal Film Resistor
FR	:	Fusible Resistor

CAPACITORS – All capacitance values are in μF, unless otherwise indicated.

P	:	μμF
C Cap	:	Ceramic Capacitor
E Cap	:	Electrolytic Capacitor
FM Cap	:	Film Mica Capacitor
MM Cap	:	Metalized Mylar Capacitor
MP Cap	:	Metalized Paper Capacitor
MY Cap	:	Mylar Capacitor
NP Cap	:	Non-polar Capacitor
PC Cap	:	Polycarbonate Capacitor
PP Cap	:	Poly Pro Capacitor
PS Cap	:	Polystyrol Capacitor
T Cap	:	Tantalum Capacitor
TR Cap	:	Trimmer Capacitor

Tolerance of resistors or capacitors are as follows:

M	:	± 20%
K	:	± 10%
J	:	± 5%
G	:	± 2%
F	:	± 1%

POWER P.W.B. ASS'Y PU48206C

Symbol No.	Part No.	Part Name	Description
	PU48207	Power P.W.B.	
D 1	S4VB10	Diode	
R 1	QRD123K-102	CR	1 K ½ W, K
C 1	QFH52AM-104	MM Cap	0.1 100 V
⚠ C 2	QEV71ER-338	E Cap	3300 25 V
C 3	QET41ER-107	"	100 "
⚠ F 1	QMF51A2-R50-BS	Fuse	0.5 A
⚠ F 2	-2R0-BS	"	2.0 A
	A44594-001	Fuse Clip	
	PU47030	Sticker	